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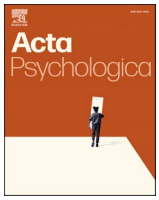

# A scientometric review of the scientific literature on child effects on adults: Topics of interest and areas for development in psychological research☆

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ABSTRACT

Considerable effort has been devoted to understanding how parents influence child development. Less attention has been given to the effects that children exert on their parents. This review aims to systematically survey the links between scientific articles exploring this question. Results of a document co-citation analysis reveal that research on this topic has been scarce and primarily concerned by how child and adolescent disruptive behaviour negatively impacts parents. Academic attention is directed to research that conceptualizes child effects as the outcome of genetic or temperamental predispositions. The implications of such a constrained view of child influence are discussed, highlighting the need for applied research on how children can actively contribute to positive behavioural change in parents and other adults.

## 1. Introduction

### 1.1. Child effects: origins and current perspectives

The idea that children can influence adult, and more specifically parental behaviour has its roots in Bell's (1968) review *A reinterpretation of the direction of effects in studies of socialization*. In this seminal paper, Bell initiated a paradigm shift in the study of socialization processes by simply stating that parental behaviour does not solely determine child outcomes, but it is also highly influenced by and dependent upon child characteristics and behaviour. According to his *Control-System Model*, both parent and child possess a set of behavioural manifestations that are activated in response to the other party's behaviour (Bell & Chapman, 1986). The goal being to maintain balance within the relationship, child and parent both try to regulate each other's responses and control excessive behavioural manifestations. Such behavioural sequences can be observed from the very first days of life, in parental reactions to the newborn's cry or to their long moments of silence (Bell & Harper, 2020). Usual parental responses include taking a crying newborn in one's arms to calm down, or checking on and stimulating a newborn that has been quiet for an unusual amount of time. Bell's work became the springboard for a new line of research exploring the role of the child within the parent-child dyad. The first experimental studies focused on exploring adult or parental responses in the areas of dependence, discipline, and responsiveness by experimentally manipulating the child's behaviour (Bates, 1976; Buss, 1981; Osofsky & O'Connell, 1972).

*Social Relational Theory* (Kuczynski & De Mol, 2015) posits that parents and children are active agents who are developing in and equally contributing to a long-term relationship that exists within a certain cultural context. Even though researchers still try to determine the magnitude of each party's influence and the extent to which this influence is self-conscious, there is a consensus that the parent-child relationship is characterized by bidirectional influences on physiological and behavioural levels across both cognitive and affective dimensions (Paschall & Mastergeorge, 2016).

The way we perceive the child's role, whether as an active source of influence or a passive recipient of it, extends beyond the parent-child relationship and bears a stronger significance for society as well. This perspective profoundly influences our decision-making processes and shapes the design and implementation of educational and intervention programs. More than half a century after Bell's (1968) seminal paper, it

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seems worthwhile to reflect upon the progress made in the study of child effects within our discipline and contemplate future directions for research and practice.

### 1.2. The present review

The purpose of the present review is to provide a comprehensive overview of the current state of research on child effects. Our objective is to identify pivotal topics of interest, influential studies, as well potential areas for further development within the discipline. In pursuit of this objective, we decided to adopt a scientometric approach and conduct a Document Co-Citation Analysis (DCA) (Chen, 2016; Chen et al., 2010). The outcomes of this analysis are anticipated to offer insights into the most frequently referenced works and to unveil evolving thematic trends within the field of child effects by creating interlinked networks of co-cited references. With children assuming more and more active roles within both familial and societal contexts, it seems imperative to explore and reflect upon how child effects have been conceptualized and studied over the course of time and to illuminate the works that have received the greatest attention within the academic community.

## 2. Methods

### 2.1. Search strategy and data collection

The Web of Science Core Collection (WoSCC) has been recognized as a highly suitable database for conducting scientometric analysis (Mongeon & Paul-Hus, 2016). The database was accessed on the 21st of September 2023. The search encompassed all available sources within the WoSCC database, employing the search terms 'child effects' OR 'child influence' in 'all fields'. We opted to narrow our search terms to these keywords, without including broader terms such as 'bidirectionality', in order to target research designed explicitly to examine child effects. Additionally, our focus was specifically on developmental periods beyond early infancy, which guided our decision to use search terms centered on "child" rather than "infant" influences. Publication types were limited to 'article', and language to 'English'. The search resulted in a total of 229 citing records published between January 1964 and November 2023 which were extracted, along with cited references, to a plain text file.

### 2.2. Data import

Records were imported into CiteSpace (version 6.1.R2) to proceed with analysis (Chen, 2016). The software detected a total of 10′057 references cited by the 229 citing records. Of these, 9′852 (97.96 %) were considered as valid due to the presence of identifying information. Invalid references were excluded from the analysis.

### 2.3. DCA configuration parameters and metrics

When conducting a DCA, CiteSpace detects and visualizes clusters of documents that are frequently cited together by a third source (Small, 1980). The underlined theoretical assumption of DCA is that documents that are cited together regularly most probably explore the same concept (Chen et al., 2010).

The maximum number of links that a node (reference) is allowed to form (L/N), or time retention criteria about which cited references of source (citing) articles will be included (LBY) are parameters that will determine the network's nature and structure. Citespace provides default values for these parameters which can be modified in order to obtain better networks (Chen, 2016). For the final DCA, default values of such properties were maintained, as they provided the most balanced network structure while preserving meaningful co-citation relationships. Alternative configurations were tested, but they did not significantly improve the interpretability of clusters.

The criteria for selecting nodes are also crucial parameters that will determine which references will be included in the network. Citespace offers various criteria for node selection. We opted for the *g-index* as it does not solely concentrate on maximum citation counts within a certain time frame, but also considers the global distribution of citations in the dataset (Egghe, 2006). Publications are arranged in descending order according to their citation counts. The g-index equals the sum of the most cited $g$ articles that have collectively received at least $g^2$ citations. We conducted multiple DCAs with varying values of the scaling factor $k$ for the *g-index*, specifically at 125, 100, 75, 50, 25 and 15. The optimal network was identified based on its metrics, and it was generated by setting $k$ for the *g-index* to 75, as this value provided the best balance between cluster granularity and network cohesiveness.

Citespace uses three metrics to calculate the balance and significance of a network's structure. The *average silhouette score* ($S$) is an index of both the homogeneity within individual clusters (groups of nodes), as well as the distinction between clusters within a network. It is measured on a scale from −1 to 1, with values closer to 1 signifying a greater level of accuracy in clustering (Chen, 2016). The *modularity Q* indicates the extent to which a network can be deconstructed into clusters (Chen et al., 2010). Its values range from 0 to 1, with higher values suggesting better network structure. *Betweenness centrality* illustrates a node's importance in connecting two other random nodes in the network. Its values range from 0 to 1, with higher values denoting a paper's higher influence (Chen, 2022).

Citespace also uses several temporal metrics that outline research trends and concept evolution over time. *Sigma* ($\Sigma$) is calculated using this equation $(centrality + 1)^{burstness}$ and is an index of a publication's innovation. It has a minimum value of 1 and higher values indicate greater novelty (Chen et al., 2010). *Citation burstness* refers to sudden spikes in the number of citations a publication receives at a specific period, signifying more attention from the academic community (Chen et al., 2009).

## 3. Results

Our final network of 1′819 nodes (references) and 5′753 links contained citing articles from the WoSCC records, as well as cited work detected in their reference lists. The final network displayed very good metrics: an *average silhouette score* of 0.9865 and a *modularity Q* score of 0.9702. These values suggest that the network can be deconstructed into separate clusters characterized by both intra-cluster homogeneity and inter-cluster distinctiveness. In total, the final network revealed ten prominent clusters. Citespace also automatically generated log-likelihood ratio (LLR) labels for each cluster (Fig. 1). Metrics for each cluster are presented in Table 1. No reference in the final network exhibited a citation burst.

Due to space constraints, it is not feasible to comprehensively address all clusters in this review paper. Therefore, the following section will specifically focus on the four largest clusters (#0, #1, #3, #4). Table 2 displays metrics for the most representative source articles within the four major clusters. *Global Citing Score* (*GCS*) refers to the sum of citations that the publication has received in WoSCC. *Local Citing Score* (*LCS*) is the citation count of the publication in this study's dataset, while *Coverage* refers to the number of references cited by the source publication.

After reviewing the final database extracted from CiteSpace, we manually excluded certain cited literature from the cluster discussion to ensure that only references contributing to theoretical and empirical discussions on child effects were retained. For cluster #0, 1 cited document was excluded from discussion because it could not be identified ($N = 1$; 1.22 %), 7 focused on statistical methods ($N = 7$; 8.54 %), 1 was a software user guide ($N = 1$; 1.22 %) and 1 was a diagnostic manual ($N = 1$; 1.22 %). For cluster #1, 5 documents could not be identified ($N = 5$; 7.04 %), 1 was a diagnostic manual ($N = 1$; 1.41 %) and 2 referred to statistical methods ($N = 2$; 2.82 %). For cluster #3, 1 document could

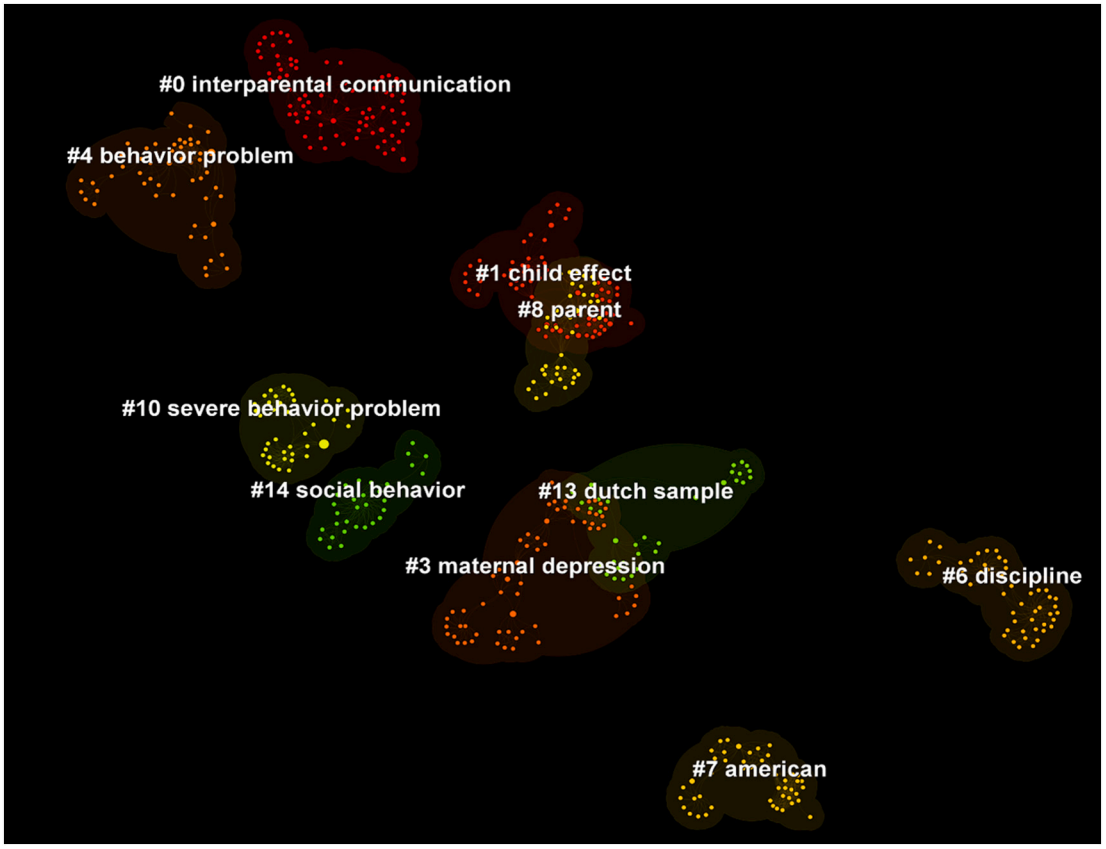


**Fig. 1.** Visual representation of the optimal DCA network of nodes, with prominent clusters arranged by color.

**Table 1**
Metrics of the DCA network's 10 prominent clusters.

| Cluster ID | Size | Silhouette | Mean year | LLR label | Proposed label |
|---|---|---|---|---|---|
| 0 | 82 | 0.99 | 2007 | Interparental communication | Parental conflict |
| 1 | 71 | 0.958 | 2002 | Child effect | Parental negativity and behaviour |
| 3 | 63 | 0.979 | 2007 | Maternal depression | Parental depression and household chaos |
| 4 | 53 | 0.997 | 2012 | Behaviour problem | Parenting style and scaffolding |
| 6 | 51 | 1 | 2002 | Discipline | |
| 7 | 46 | 0.999 | 2009 | American | |
| 8 | 41 | 0.984 | 2004 | Parent | |
| 10 | 38 | 0.986 | 1992 | Severe behaviour problem | |
| 13 | 33 | 0.99 | 2001 | Dutch sample | |
| 14 | 31 | 1 | 1995 | Social behaviour | |

**Table 2**
Citing articles and metrics for clusters #0, #1, #3 and #4.

| Cluster | Citing article | Year | GCS | LCS | Coverage |
|---|---|---|---|---|---|
| #0 | Wymbs | 2011 | 12 | 0 | 13 |
| | Hawkings et al. | 2007 | 103 | 0 | 12 |
| | Amato and Cheadle | 2008 | 75 | 0 | 12 |
| #1 | Jaffee et al. | 2004 | 194 | 0 | 20 |
| | Frye and Garber | 2005 | 72 | 0 | 19 |
| | Larsson et al. | 2008 | 160 | 0 | 13 |
| | Forbes et al. | 2008 | 29 | 0 | 12 |
| #3 | Gross et al. | 2008 | 80 | 0 | 15 |
| | Choe et al. | 2014 | 25 | 0 | 13 |
| | Hanscombe et al. | 2011 | 49 | 0 | 13 |
| | Raposa et al. | 2011 | 27 | 0 | 9 |
| #4 | Lansford et al. | 2018 | 62 | 0 | 18 |
| | Lippold et al. | 2019 | 7 | 0 | 8 |
| | Eisenberg and Vidmar | 2010 | 62 | 0 | 7 |

not be identified ($N = 1$; 1.59 %) and 1 was a statistical software guide ($N = 1$; 1.59 %). For cluster #4, 2 documents could not be identified ($N = 2$; 3.77 %) and 3 addressed statistical methods topics ($N = 3$; 5.66 %).

## 4. General discussion

### 4.1. Cluster #0: parental conflict

Representative articles of this cluster explore parental conflict and its relationship to child disruptive behaviour (Amato & Cheadle, 2008; Hawkins et al., 2007; Wymbs, 2011). Longitudinal survey data support a socialization model in which parent-reported conflict and divorce individually predict child behavioural problems (Amato & Cheadle, 2008). Cited literature in this cluster suggests that child internal representations and emotional security with regard to the parental bond may explain this relationship (Cummings et al., 2006, 2008). Strict parenting practices have also been found to mediate the association between mother-reported marital relationship quality and other-reported child disruptive behaviour (Chang, Lansford, Schwartz, & Farver, 2004). During preschool, parental conflict seems to impact affective aspects of parenting, like maternal acceptance (Davies et al., 2004). In contrast, as children enter childhood, this conflict begins to influence child behavioural problems through the emergence of harsher disciplinary practices and increased parent-child arguments (Gerard et al., 2006). Similar explanatory processes have also been proposed for youth internalizing behaviours (Krishnakumar et al., 2003).

If parental conflict affects child externalizing behaviours through

more controlling parenting practices, then it is important to consider the possibility that such parental arguments are about the child. Indeed, Jenkins et al. (2005) found that, from childhood to late adolescence, it was child relevant - and not general - interparental conflict that predicted child behavioural problems; interestingly, the latter was also a significant predictor of child relevant parental conflict.

From a child effects perspective, results of early studies made clear that an infant's negative temperament may affect both mothers and fathers on an individual level, which in turn leads to self and partner representations that are menacing to the marital relationship (Crockenberg & Leerkes, 2003). Wymbs (2011) used partner-reported and observational data in an experimental paradigm where parents interacted with child-trained confederates. The study revealed that child disruptive behaviour influenced partner representations of parenting, primarily leading to negative parenting practices and subsequent negative inter-parent communication. Interestingly, in the unlikely case where disruptive behaviour elicited positive partner communication, the relation was mediated by parental positive perceptions of their partner's parenting, especially for parents of children with Attentional Deficit Hyperactivity Disorder (ADHD); yet observational data did not confirm that the partner engaged indeed in better parenting. Even though parental perceptions of partner's positive parenting may not always be accurate, in the context of a permanent condition that affects child behaviour such representations may reflect a supportive inter-parent relationship and can counteract the child disruptive behaviour effects on parental conflict.

When studying the parental conflict – child aggression interplay, it is easy to wonder whether there is a genetic component that could explain the association between the two. Amato and Cheadle (2008) found no significant differences between adopted and biological children, leaving uncertainty about the heritable or environmental factors behind the link between parental conflict and child behavioural problems. Adoptive parents have been found to report equal levels of disagreement, yet higher marital satisfaction and less stress than biological parents (Ceballo et al., 2004). Couples seeking adoption are typically older, more financially stable, and undergo a strenuous process to become parents, potentially strengthening their emotional bond, fostering positive partner representations, and shielding them from the negative impact of child aggression on parent communication (Hamilton et al., 2007).

Intense and prolonged parental conflict can sometimes lead to divorce, resulting in significant changes in family structure and living conditions. While disparities in well-being between children of divorced parents living with a stepparent and children living with married parents appear to diminish when considering parental and financial resources, this is not the case for adolescents. For them, living in a stepfamily is linked to lower levels of well-being and reduced school engagement (Brown, 2004). In Jenkins et al. (2005), adolescent disruptive behaviour significantly predicted higher rates of couple conflict, especially in stepfamilies. Maintaining a strong positive relationship with the biological non-resident father can act as a buffer for many negative internalizing, as well as externalizing outcomes for the adolescent, especially when the mother-adolescent relationship is disrupted as a result of the new stepfamily dynamics (Fanti et al., 2008; King & Sobolewski, 2006). Hawkins et al. (2007) revealed how adolescent self-esteem, disruptive behaviour and academic achievement predict non-resident paternal engagement in the adolescent-father relationship. Adolescent disruptive behaviour and low self-esteem predicted less paternal contact and engagement in shared activities one year later, while contact and communication frequency from the father's side increased after the adolescent's academic success. Although there was no support for reciprocal or parent-to-adolescent effects in non-resident fathers, reciprocal effects were confirmed between adolescent self-esteem, as well as academic performance, and paternal engagement in resident fathers.

When studying parental conflict and child disruptive behaviour within a nuclear family structure, a transactional approach considering both child and parent as potential sources of influence may be more suitable (Kuczynski & De Mol, 2015). Nevertheless, a child-effects approach might be more relevant when examining parental engagement in relationship to child wellbeing in families that present a structure other than the traditional one.

### 4.2. Cluster #1: parental negativity and behaviour

The most cited articles in this cluster focus on how child disruptive behaviour affects parenting practices and to what extent such effects are determined by the child's genetic predispositions (Forbes et al., 2008; Frye & Garber, 2005; Jaffee et al., 2004; Larsson et al., 2008). From a parent driven effects perspective, maternal depression has been associated with increased criticism towards the child and both have been found to individually predict child and adolescent maladjustment (Bolton et al., 2003; Brennan et al., 2000; Nelson et al., 2003). Even though the presence and severity of maternal depression have been associated with negative outcomes for offspring wellbeing in the long-term, physiological indices of a child's withdrawal affective tendency combined with frequent behavioural manifestations of negative affect have also been related to an increase of depressive symptoms in mothers with a long history of depression (Forbes et al., 2008; Frye & Garber, 2005). In support of the child-effects approach, Frye and Garber (2005) suggest that adolescent aggression and delinquency mediate the relationship between maternal depression and maternal criticism. Since adolescent behaviour was measured through maternal self-report, and adopting a diathesis-stress approach of depression, it is possible that depressed mothers may have a greater tendency to perceive noticeable aggressive behaviours in their children, which in turn can immediately elicit responses of maternal criticism (Hooley & Hiller, 2000). Additive models in which maternal depression history was combined with either adolescent externalizing or internalizing symptoms, and which were tested for their effects on maternal criticism practices, were confirmed longitudinally; thus, supporting a reciprocal perspective in which child aggressive behaviour elicits immediate responses of maternal criticism and together they longitudinally and dynamically contribute to the course of depression. It cannot be concluded however that such child effects are due to a genetic component that predisposes children of depressed mothers to affective withdrawal and disruption.

Representative research in this cluster also explores to what extent child antisocial behaviour effects on parenting practices and affect are genetically or environmentally determined (Jaffee et al., 2004; Larsson et al., 2008). Such variance decomposition of genetic and environmental effects can be carried out by studying monozygotic (MZ) and dizygotic (DZ) twins. Behaviour genetic research evidence provides an overall support for a strong genetic influence on child antisocial behaviour (Arseneault et al., 2003; Moffitt, 2005). Nonetheless, even after controlling for the influence of the genetic component, maternal negativity and absence of warmth are still significant predictors of child antisocial behaviour, suggesting that environmental factors can causally contribute to child maladjustment (Caspi et al., 2004).

Heritable characteristics in children significantly contribute to the association between negative parental affect towards the child and the child's antisocial behaviour, both over time and in the short term. The relationship between parental negativity and child antisocial behaviour seems to be bidirectional and strongly influenced by genetics (Larsson et al., 2008). Knafo and Plomin (2006) discovered that low child prosocial behaviour is related to harsher parenting through genetic factors, while high child prosocial behaviour is linked to positive parenting practices, primarily through shared environmental experiences. Thus, it could be assumed that harsher parenting and negative affect is the result of the child's genetically determined antisocial behaviour, while child prosocial behaviour results from positive parenting practices. It seems contradictory however that, a genetic predisposition would explain one extreme of the phenotypic expression continuum and not the other within the same sample. Likewise, aggressive antisocial behaviour,

which is known for its consistent developmental trajectory, exhibits a primarily genetic influence during childhood. However, during adolescence, it becomes evident that the phenotype results from an interplay of both shared environmental factors, such as negative parenting practices, and genetic predisposition (Eley et al., 2003). A simple interpretation could be that aggressive children will elicit negative parenting practices due to their genetic makeup early in development, and these will in turn further contribute to adolescent aggression. An alternative interpretation however could be that, genetically predisposed to aggression children will present better behavioural outcomes during adolescence after exposure to positive parenting practices.

Genetic predispositions may be activated in certain environmental conditions and not in others. This gene – environment interaction results in big, confounded estimates of genetic influence especially when behaviour is measured during childhood. In Jaffee et al. (2004), antisocial heritable characteristics in 5-year-old children partially explained (along with shared environments) parental practice of corporal punishment, but not maltreatment. Variation in maltreatment, which results in severe physical injury for the child, was almost entirely explained by shared environmental factors in the study. Nevertheless, these findings describe a specific, high-risk sample of early childbirth mothers and need to be generalized with caution (Trouton et al., 2002). Early childbirth has been associated with more financial difficulties and mental health challenges (Moffitt and E-Risk Study Team, 2002). In the case of corporal punishment, big estimates of genetically determined child influence may result from its interaction with risky environmental factors. In the case of maltreatment, the 'risky environment' may overshade genetic influences that may protect the child from engaging in antisocial behaviour (Caspi et al., 2002). Within this context however, children are either passive emitters of influence through their genes or receptors of parent shaped environmental influences that could also be genetically determined to a certain extent (Neiderhiser et al., 2004; Wade & Kendler, 2000).

An important limitation of the cluster's behavioural genetics studies is that information on child and parent behaviours was collected through parental self-report measures (Jaffee et al., 2004; Larsson et al., 2008). Therefore, results only reflect parental perceptions of twin similarity. In Larsson et al. (2008), parents did not even fill the questionnaires for the younger twin; they only had to answer to questions about the older twin and were simply asked whether they felt similarly for the younger one.

### 4.3. Cluster #3: parental depression and household chaos

Most representative articles in this cluster focus on the effects between parental depression and child psychopathology (Choe et al., 2014; Gross, Shaw, & Moilanen, 2008; Raposa et al., 2011). Determining the direction of effects between the two, across development, is not a simple task since the relationship is dynamic. Toddlerhood can be a particularly stressful period for parents, who are trying to impose boundaries on their toddler's growing physical activity. In Gross, Shaw, Moilanen, Dishion, & Wilson, 2008, toddler non-compliance at the age of two years old was positively associated to maternal depression; a similar trend was present for paternal depression, thus providing support for reciprocal influences. Bidirectional effects were also found for maternal depression and five- to six-year-old children's aggressive behaviour. Similar effects between maternal depression and toddler oppositional behaviour from two to three years old were also found in Choe et al. (2014).

From a developmental perspective of child effects, toddler non-compliance at 18 months significantly predicted the trajectory of maternal depression over an eight-and-a-half-year period (Gross et al., 2009). Similarly, other-rated child oppositional behaviour at two years old predicted maternal depression three years later, with the effect being mediated by the child's ability of inhibitory control at the ages of three and four (Choe et al., 2014). When it came to mother ratings though, the same ability, at age three, mediated the effect of maternal depression at two years old on child oppositional behaviour at age four. Interestingly, there was no association between changes in both behaviours over the three-year period.

Analogous child influences on maternal depression have also been found in adolescent samples. Adolescent number of diagnoses at the age of fifteen predicted the presence of maternal depression and the number of depressive episodes five years later, with child-related acute and chronic stress individually fully mediating the former relationship (Raposa et al., 2011). Adolescent aggression at eleven years old has been found to influence maternal depression one year later; yet the inverse pattern was confirmed between the ages of ten and eleven (Gross, Shaw, & Moilanen, 2008). Earlier in development, the presence of maternal depression up to three months postpartum predicted child violent behaviour, which was associated with ADHD symptomatology and self-regulation problems, at eleven years old; and this, especially in the presence of additional depressive episodes during these years (Hay et al., 2003). Finally, chronic and severe maternal depression appears to predict adolescent antisocial and externalizing symptoms, while this is not the case for internalizing symptomatology (Gross et al., 2009).

Adolescents with mothers presenting a history of depression have a greater risk of developing depression themselves, with severity of maternal depression being more important than chronicity, and timing of exposure being unimportant (Hammen & Brennan, 2003). For toddlers, other-reported paternal depression symptoms have been associated with concurrent child internalizing behaviours at four years old (Gross, Shaw, Moilanen, Dishion, & Wilson, 2008). Overall, the presence of parental depression symptomatology increases the risk for child non-compliant and adolescent externalizing problems, which in turn have an impact on parental depressive trajectories. Alternately, parental depression appears to either precede or occur simultaneously with child/adolescent internalizing psychopathology.

As previously mentioned, the phenotypic expression of a genotype heavily relies on environmental experience. In the case of depression, having a specific 5HTT gene variant will increase the risk of developing depression for an individual only after exposure to childhood trauma (Caspi et al., 2003). A child or adolescent that might be genetically predisposed to develop a sort of psychopathology will actively engage in a certain way with a safe and stable environment, and differently with a risky and unstable one. For example, parental depression has been associated to marital conflict, which can result to noisy fights, interruption of routines and a generally unstable environment (Cummings et al., 2005; Elgar et al., 2004). A genetically predisposed child may perceive this environment as menacing and either passively respond to it by occasionally retracting (internalizing), or actively react to it in aggression (externalizing); actions that will inevitably counter impact the marital relationship and depressive symptoms (Cui et al., 2007). Thus, creating a vicious circle. However, in the presence of a safe environment such genetically determined child-driven mechanisms that contribute to the development of psychopathology may not be activated.

One of the most cited articles in this cluster explores how chaotic circumstances in the household relate to children's academic performance (Hanscombe et al., 2011). Cited literature suggests that a lack of daily routine and structure, which is usually provided by parents, negatively impacts young children's performance in academic tasks, as well as parent reported adjustment, through bad sleep (Brown & Low, 2008; Coldwell et al., 2006). Extending these findings, Hanscombe et al. (2011) reported that perceptions of household chaos in twin pairs was a negative predictor of teacher-reported academic performance and remained stable over a three-year period. Furthermore, one third of the variance in this association seemed to be explained by genetic factors, the rest being explained by shared environment.

Gene-environment correlation refers to the notion that individuals actively select or passively experience environments in a way that is consistent with their genotype (Kendler & Baker, 2007). From that perspective, genetic influence in chaos-academic performance

associations could be partly explained by a child being genetically predisposed and passively accepting parental tendencies to live in chaos, which in turn undermine academic achievement. Alternatively, children's genetic predisposition to non-compliance could lead them to actively create disorder in their environment by not cooperating with adults, who ultimately accept chaotic living circumstances in order to avoid conflict.

Even though the concept of gene-environment correlation remains deterministic in nature, with genetic predisposition shaping environmental experience, it allows some room for reflection on the gene-environment interplay considering associations between parental depression, child psychopathology, household chaos and academic achievement. Shared environments in twin studies seem to explain approximately one sixth of internalizing and externalizing symptomatology in children and adolescents. In support of children's active role in experiencing their environments, no difference has been identified between adopted and biological children (Burt, 2009).

### 4.4. Cluster #4: parenting style and scaffolding

Toddler self-regulatory abilities seem to influence the way that mothers provide verbal guidance during task resolution (Eisenberg et al., 2010), while child and adolescent behavioural problems seem to impact central dimensions of parenting styles (Lansford et al., 2018; Lippold et al., 2019).

Voluntary processes of emotion self-regulation seem to develop at a fast rate in toddlers and young children, while they also manifest a relative stability in individual differences across development after the first year of life (Eisenberg, Spinrad, & Eggum, 2010). Effortful control refers to a child's ability to direct attention and intentionally activate or inhibit a behaviour; it describes a dispositional tendency that grows rapidly during toddlerhood. Combining a multi-reporter with an observational approach, Eisenberg et al., 2010 found that perceived levels of toddler's effortful control at 18 months strongly predicted frequency of different verbal strategies used by mothers in helping their child complete a task. Specifically, high initial levels in child effortful control predicted a more frequent use of maternal questions and verbalizations that assisted the child's comprehension of the task, and less direct instructions about what the child should do. Evidence of the importance of a child's early regulatory skills on parenting have also been found during infancy, with parents of infants who experience difficulties during the first year of life engaging in more negative parenting practices at 18 months (Bridgett et al., 2009).

Evidence in support of mother-directed effects principally refer to dimensions of parenting styles. In older children, starting primary school, low levels of effortful control have been associated with lower levels of maternal responsiveness at the age of two years old; extreme levels of maternal control were also found to negatively affect the growth rate of involuntary processes of self-regulation (Graziano et al., 2010). Regarding the dimension of control, pre-schoolers with parents who scored high on psychological control (favoured suppression of emotion in their children) were more restrained in their affective reactions in a series of emotion-elicitation tasks (Louie et al., 2013).

Taken together, there seems to exist a particular moment early in development where child temperamental emotion regulation ability will strongly shape initial parental perceptions and behavioural responses. For infants who experience more difficulties, there is a greater probability for aversive parental responses, which will in turn result in negative affective experiences that the toddler finds difficult to manage. Consequently, parents will respond negatively to this behaviour, thus creating a vicious circle that can, in the long-term, shape parental behaviour across dimensions which define the general parenting approach/style. It is likely though that the quality of initial parental responses could be improved with education and developmentally appropriate interventions. For example, pre-schooler's emotion regulation abilities and maternal scaffolding emerged as the best predictors of social competence measured two years later in children with a developmental delay; even though, this was not the case for typically developing children (Baker et al., 2007). It seems like although genetically predisposed children will suffer negative outcomes within adverse environmental circumstances, at the same time they can benefit the most from growth fostering environments. We could hypothesize that parents of children with developmental delay tend to seek for and receive more parental support and training, which could result in better behaviour and emotion management skills. In designing and implementing such interventions, it is important to consider both parents (fathers are massively underrepresented in early childhood research) and how the different ways that they engage in emotional talk with their toddlers interact with child temperamental trends in shaping emotion regulation patterns later, in childhood and adolescence (Denham et al., 2010).

Low emotion self-regulation ability has been associated with concurrent and future externalizing problematic behaviours in childhood and adolescence (Eisenberg, Spinrad, & Eggum, 2010). While at the beginning of schooling, there seem to be reciprocal effects between parenting practices and child disruptive behaviour, the latter emerges as a consistent predictor of parental hostility until the age of 8 years old (Besnard et al., 2013). Child behavioural problems have also been found to predict an authoritarian parenting style (low warmth and high control) between the ages of 8–13 years old across nine different countries (Lansford et al., 2018). The only parent-driven effects observed in this study coincided with child-effects at approximately 9 years old. Specifically, low parental warmth and high parental control were predictive of subsequent child internalizing and externalizing problems one year later. These reciprocal effects seem to be specific to this time of development and to these parenting dimensions. De Haan et al. (2012) also found that high parental over-reactivity and low warmth at 9 years old predicted late adolescent aggression and vice versa.

Even though parenting style does not seem to determine child problematic behaviour in early and middle childhood, its significance becomes more pronounced during late childhood, and its effects become evident during adolescence. It is parental harshness exerted around the age of 10 years old that significantly predicts adolescent externalizing behaviours at 15 years old; not parental harshness exerted during adolescence (Bradley & Corwyn, 2013). As externalizing behavioural patterns stabilize during the transition from childhood to adolescence and as adolescents become more and more independent, child driven effects become prominent and result in increases in parental harshness, as well as in decreases in monitoring and productive activity opportunities offered by parents (Bradley & Corwyn, 2013). However, it seems that parental monitoring can positively impact concurrent adolescent externalizing problems, as well as risky sexual behaviour (Bradley & Corwyn, 2013; Dittus et al., 2015).

The notion of consistency within the parenting style dimensions was recurrent in their relationship with adolescent aggression and delinquency. Perceived changes in parental warmth and hostility predicted higher delinquency and substance use in adolescents over a two-year period, especially for girls (Lippold et al., 2018). In support of the proposition that adolescent behavioural challenges can negatively impact parental affect and result in inconsistency in parenting practices, there is also some evidence of young adolescent exerted effects on parental lability two years later (Bornstein & Leventhal, 2015; Lippold et al., 2019). The relationship between concurrent changes in parental warmth and adolescent delinquency appears to be moderated by parental internalizing symptomatology (Lippold et al., 2019). Inconsistency is not solely relevant to the affective aspects of parenting, but also to the behavioural ones, such as monitoring, and particularly knowledge of the adolescent's daily activities, whereabouts, friendships, and worries. Stressed parents report higher inconsistency in knowledge, which is in turn associated with higher risky behaviour for girls, but higher levels of psychological wellbeing for older male adolescents (Lippold et al., 2015). In terms of direction of effects, preliminary results

are in support of parent driven effects, with higher parental knowledge lability during early adolescence predicting higher alcohol and tobacco consumption two years later, as well as higher delinquency and internalizing behaviour for girls (Lippold et al., 2016).

Unfortunately, the cluster did not contain much information on the relationship between parenting approach and child internalizing behaviour, apart from a general association between inconsistent and unresponsive parenting with adolescent internalizing symptoms (Johnson & Greenberg, 2013). Inconsistency in parental acceptance-rejection patterns appears to be associated with both internalizing and externalizing symptomatology in middle childhood and early adolescence (Putnick et al., 2015).

## 5. General conclusion and perspectives

Over the years, research has made a significant effort not only to identify potential child effects within the family structure, but also to discern the specific developmental moments when these effects are more important than parent directed effects. An infant's challenging temperament seems to negatively impact new parent representations of each other and lead to more conflict. Likewise, a child's aggressive behaviour can elicit negative parenting practices, thus reinforcing negative partner representations and contributing to impaired communication and conflict. Finally, adolescent externalizing behaviour appears to significantly influence paternal engagement in the context of divorce. However, it seems that researchers have been less concerned about how such effects impact other adults in the child's life. For example, a preschooler's aggressive behaviour effects may extend beyond the family sphere and impact their interactions with other adults in their proximal environment, such as teachers (Doumen et al., 2008). Such publications have not received much attention from the academic community.

When it comes to how child aggressive behaviour can evoke parental negativity towards the child or specific parenting practices such as criticism and corporal punishment, there seems to be a prevailing perspective that such child effects have a strong genetic component. Even though behavioural genetic designs allow researchers to disentangle bidirectional effects between parenting practices and child behaviour that could be - to a certain extent- genetically determined, they do not take into consideration nonheritable child characteristics that can explain variation in child-effects. Furthermore, from a developmental standpoint, the notion of additive genetic effects suggesting greater similarity in MZ twins compared to DZ twins is incomplete and does not take into consideration gene-environment interactions that may explain and contribute to variations in the phenotype (Briley et al., 2019; Purcell, 2002). Another important consideration is that the data in most behavioural genetics studies mainly come from extensive national surveys, using parent-reports to assess child behaviour. Parental perceptions of twin similarity have been found to be biased for MZ twins (Saudino et al., 2000).

Child externalizing symptoms affect the course of pre-existing parental depression by eliciting additional stress. Taking into consideration, along with the cited literature, that the efficacy of interventions which target child externalizing behaviours depends on maternal depression and child internalizing symptoms, it seems that externalizing symptomatology results from a pre-existing environmental setup (Beauchaine et al., 2005). Thus, child effects that impact the course of parental depression are considered as the result of children's maladaptive reaction to a non-ideal environment created by the adult. Even though it may not seem so, the observation that the relationship between household chaos and child academic performance has a strong genetic component is relevant to the discussion since parental depression can often create chaotic circumstances at home (Elgar et al., 2004). If genetics determine an important part of variability on how children will be affected by or react to a particular environment, child effects are always resulting from either that gene-environment interaction or correlation.

A similar conclusion can be drawn regarding infant and toddler effortful control effects on parent scaffolding strategies, or child disruptive behaviour negative effects on parental control, warmth, and the consistency of the parenting style. Predominantly evaluating parenting and child behaviours within the overarching concepts of parenting style and temperament, and not through specific behavioural sequences, constrains our perception of child effects (Eisenberg, Spinrad, & Eggum, 2010). Identifying specific verbal scaffolding responses elicited in mothers by toddlers with varying levels of effortful control is important, but it still does not provide information on which specific toddler behaviour elicited a maternal response (Eisenberg, Vidmar, et al., 2010). Acquiring such information is vital in designing interventions and educational programs for parents and/or children that specifically address these effects.

This consideration similarly applies to the effects of disruptive child behaviour on all parenting constructs addressed in this review. Studies employ broad definitions of disruptive behaviour, often using interchangeable terms such as antisocial, disruptive, aggressive, or externalizing behaviour. Furthermore, there is huge variability in the measures used to assess this construct. Another limitation is the heavy reliance on parental—predominantly maternal—reports to assess child behaviour.

It is crucial to highlight that contemporary research on child effects has predominantly focused on the adverse impact of child externalizing behaviours on the overall parental experience and parenting practices. Such effects are mainly conceptualized as passive, stemming from genetic/temperamental predispositions which either interact with adverse preexisting environments or lead children to construct their environments in a way that impels them to behave maladaptively. This narrow perspective could also explain the absence of citation burstness in this review. There is a lack of research, compounded by a paucity of academic focus on the few available articles addressing the question, on how intentional child behaviours can positively impact the parental experience, fostering positive behavioural changes in adults within the family, as well as in the broader societal context (Correa, 2014; Van Den Bulck et al., 2016).

Over the past decade, many educational interventions have been designed for children with the aim of indirectly influencing adult attitude, decision-making and behaviour. Such interventions are based on dialectical models of intergenerational learning which presume that children, as well as parents, can contribute to a common cognitive understanding within the relationship by bringing in information from their own experience (Kuczynski & Parkin, 2007). These programs have yielded noteworthy results in important issues such as, wetland conservation (Damerell et al., 2013), wildlife preservation (Marchini & Macdonald, 2020), as well as breast cancer awareness (Soto-Perez-de-Celis et al., 2017). Nevertheless, these studies primarily rely on self-report measures to assess parental shifts in attitudes and behavioural intentions, without directly testing child effects on adult behaviours. Hence, it is imperative to conduct experimental studies that observe child-parent/other adult behavioural sequences in the transmission of such information with the purpose of creating such educational or prevention programs.

Future research on child effects should consider the role of child intentionality and how children can actively influence parent or other adult thought, affect and behaviour in a positive way. Child attempts of influence are often perceived as accidental outcomes of involuntary reactions, associated with a perceived lack of self-control, and are not recognized as intentional and purposeful behavioural expressions.

To conclude, while our article selection process aimed to isolate child effects as independent variables, the co-citation clustering inherent in our analysis reveals an important methodological constraint: the literature continues to conceptualize child effects alongside parent-driven or dyadic processes. Despite focusing on studies of child influence, the clustering process highlighted the persistence of broader contextual factors—such as parental conflict or maternal depression—that suggest child effects are often framed within the parent-child dynamic. This

tendency to view child effects as fully dependent on parental factors can constrain the scientific understanding by narrowing the focus to variables related to the parent, rather than exploring the developmental abilities of the child that may contribute to initiating positive behavioural changes. To better capture the complexity of child effects, future research should employ mixed methodological approaches that not only consider the influence of parents and other adults but also focus on identifying the developmental variables relevant to the child. These variables, which enable children to positively influence their environment and the behaviour of adults, deserve further attention to help design interventions and educational programs that support children's proactive contributions to family and societal dynamics.

## CRediT authorship contribution statement

**Eleni Kalogirou:** Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Edouard Gentaz:** Writing – review & editing, Supervision.

## Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the first author used Claude 3.7 Sonnet and ChatGPT-4 in order to refine the phrasing of specific methodological explanations and the general conclusion in the discussion section. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

## Declaration of competing interest

We have no known conflict of interest to disclose.

## Data availability

Data will be made available on request.

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