



ROLE OF EXECUTIVE FUNCTIONS/WORKING MEMORY IN PARENTING CHILDREN: A NARRATIVE REVIEW

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ABSTRACT Many parenting situations call for effective use of one's executive functions (EF) to support and rear a child. Working memory (WM) as one of the components of EF has been studied in parents in many contexts involving children and parents. But the examination of such cognitive functions that are pertinent for effective parenting skills in parents has been limited. This brief review simply narrates our current understanding of EF/WM in the context of parenting. A survey design was adopted to highlight a few studies in this context. The importance and limitations of the chosen studies along with the implications of EF/WM in parenting have been highlighted.

KEYWORDS : Parenting, Parents, Executive Functions, Working Memory

Parenting is defined as a process of raising children with protection and care to ensure their healthy development (Kretchmar-Hendricks, 2017). Many domains of skills are required for a parent such as socio-cognitive, social, self-control, problem-solving, and stress management (Azar, 2002). Hence parenting is complex, and not unitary requiring many behavioral processes, physiological and brain systems working together in general (Barrett & Fleming, 2011).

Just like any other neuropsychological constructs, Executive Functions (EF) are also wide-ranging and multidimensional. Many functions such as prioritizing and sequencing of behavior, inhibiting familiar or stereotyped behaviors, maintaining a mental set or an idea of what task or information is needed at any moment, ignoring tasks that are irrelevant or distracting, switching between various relevant information, categorizing, multitasking different situations or information are included in the term of EF (Banich, 2009). Frequently, parental EF has been discussed in the context of typical children. It is important as it impacts parental behaviors and their abilities to support and rear a child. EF makes parents generate new ideas, adapt quickly to a child's environment or situations, plan actions, avoid other distractions, and stay focused on the task with the child at hand (Wilson & Gross, 2018). An illustration of a typical parent of young children in the age group of 3 to 10 years is given as follows. Mrs. I, as a mother of two young children, has a routine for homework and dinner preparation each weeknight by 6.30 pm. She thinks through all the items required for dinner preparation while understanding the Homework assignments of her young schoolers (working memory). Any television viewing, phone calls, or casual interaction with friends or family are avoided at this hour (inhibitory control). She works by switching attention from one child to another while taking note of cooking dinner (cognitive flexibility). She comes up with new ideas to help the children understand the assignments and organizes resource materials (planning and organization) (Wilson and Gross, 2018).

As observed in the aforementioned illustration, one of the core components of EF is working memory (WM) (Miyake et al., 2000). Baddeley (1998) proposed it was a main cognitive tool that allows the individual to select appropriate information and then plan a course of action (Deater-Deckard, Sewell, Petrill & Thompson, 2010). WM is linked with many real-world activities rather than an elaborate intriguing cognitive research concept. Success and failures in many activities of daily living could be due to weak or efficient functioning of WM (Cornoldi & Vecchi, 2003). The need for the present paper was to delineate the EF/WM studies and its results concerning parent-child interactions/parenting skills. Hence the main focus in this paper is to review the studies in the last two decades on EF/WM in the context of parenting.

Method

A survey research design was adopted for this study. It was conducted in the months of April to June 2020, using the Source engines of Google and MSN in the following databases: NCBI, Semantic Scholar, Google Scholar, Researchgate, and PubMed --- where national and international publications in the field of psychology and neuroscience

were available. Studies published from 2000 to 2018 were taken for review. The keywords used were "Role of executive functions deficit in parents, Parental Executive functions, Executive functions in parents, Parenting and Executive functions, Working memory in parents of children, Working memory in parenting children".

Procedure

Data collection procedures according to the inclusion and exclusion criteria are provided in Table 1.

Table 1: Inclusion & Exclusion criteria

No.	Inclusion Criteria	Exclusion Criteria
1.	Any research article/book published in reputed Indian and/or International Journals	Opinion and Call-for-research papers in the area of parenting
2.	Original studies published in English Journals Only	Studies that investigated only siblings and teachers in EF
3.	Study objectives with cognitive or EF in the context of parenting children	Studies that investigated EF in parents of children with neurodevelopmental disorders / mental disorders as endophenotypes
4.	Full-text articles with DOI only	Studies that investigated other cognitive functions such as face-recognition, phonetic processing, reading ability, visual processing, reaction time, memory, eye-movement tracking ability, Broader Autism Phenotypes, Cognitive models in Autism without EF, in parents as endophenotypes or biochemical or neuroanatomical endophenotypes in children.
5.	Studies from 2000 to 2018 on EF as a neuropsychological measure in parenting context only	Studies on EF in parents of adolescents and adults.

From the search, about 13 studies were pertinent to the role of EF/WM in parenting and affecting parent-child interactions.

REVIEW & DISCUSSION:

The main focus of this paper is to highlight and discuss the studies using EF/WM in the context of parenting. Hence Table 2 provides a limited list of studies focusing on parents, their EF, and the effect on parent-child interactions.

Table 2 Studies on parents, EF and their effects on parent-child interactions

Studies	Parental EF	Results obtained
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Azar & Weinzierl, 2005	Poor self-regulation, self-control, poor set-shifting ability, poor goal setting	Child abuse and maltreatment
Chen & Johnston, 2007	Maternal Inattention and Impulsivity	Inconsistent discipline & reduced involvement with child
Atkinson et al., 2009	Poor selective attention	Negative attachment/emotions in mother-child interaction
Deater-Deckard, Sewell, Petrill & Thompson, 2010	Poor maternal WM	Reactive negativity in parenting
Azar, Stevenson & Johnson, 2012	Cognitive Inflexibility, Poor problem solving and Intellectual disability in mothers	Child neglect
Gonzalez, Jenkins, Steiner & Fleming, 2012	Poor spatial WM and cognitive inflexibility	Lower maternal sensitivity
Deater-Deckard, Chen, Wang & Ann Bell, 2012	Poor maternal EF	Household chaos--Harsh and distressing caregiving
Fontaine & Nolin, 2012	Parental poor decision making	Abuse and Neglect of children
Musser, Kaiser-Laurent, Ablow, 2012	Good response inhibition and regulation of behaviors	Increased maternal sensitivity
Chico, Gonzalez, Steiner & Fleming, 2014	Poor spatial WM and cognitive flexibility	Reduced maternal sensitivity, poor infant-directed vocalizations, reduced attention
Cuevas et al., 2014	Low maternal EF	Poor child EF
Azar, Miller, Stevenson & Johnson, 2017	Cognitive Inflexibility	Maladaptive supervision beliefs on child injury prevention
Azar, McGuier, Miller, Hernandez-Mekonnen, & Johnson, 2017	Maternal cognitive flexibility	Hostile attributions of child behavior

Though parenting is influenced by multiple forces coming from the parent, the child, and the social context (Belsky & Haan, 2011), good executive functioning in parents is intrinsic to nurturing and managing a child's behavior effectively (Azar & Weinzierl, 2005). Parental EF is required often due to the constant change in the developmental needs of the children along with their inability to communicate those needs (Azar & Weinzierl, 2005). Complex perceptual skills to identify and anticipate risks towards children, balancing long-term and short-term socialization goals of the children by providing alternative solutions, aversive child behaviors such as temper-tantrums and crying excessively, needs regulation of emotional reactions in parents and lastly continuous adjustment of behaviors in changing difficulties, all are comprehensively needed in parents. In all such situations, mismatch, or ambiguity in one's expectation along with problems arise, where parental EF skills are again imperative (Azar & Weinzierl, 2005). Children are naturally influenced by how parents manage and handle situations or problems thrown at them. Since younger and disabled children need more attention and monitoring, a few studies have reported parental cognitive inability to change settings while imposing safety rules, to be the reason for children being at risky situations (such as erratic climbing and falling at the playground) at home and outside (Azar & Weinzierl, 2005). On review, many factors that influence parental EF were noted. Factors such as stress (Azar & Weinzierl, 2005), mental and affective states (Ding, Yang, Qian, Gordon-Hollingsworth, 2015), sleep deprivation (Goel, Rao, Durmer & Dinges, 2009), parental age (Wilson & Gross, 2018) apart from genetic factors (Leve et al., 2013) are instrumental in influencing EF.

An analysis of these studies in Table 2, depicts that not many studies were conducted exclusively on WM. WM in the context of parenting helps in attending to the cues of the environment along with the

behaviors and needs of the child with information stored for immediate processing (Gonzalez, Jenkins, Steiner & Fleming, 2012), through emotional self-regulation (Ochsner & Gross, 2008), multitasking chores of the child and household, updating information quickly in the change of the child's unique development, auditory and visual recall with additional processing without distractions for assisting in the various domains of child development. WM is important in regulating a parent's cognitive control during interactions with the child and to modulate a parent's emotional reactions about children (Deater-Deckard, Sewell, Petrill & Thompson, 2010). Apart from the context of parenting, many day-to-day life activities would involve WM. Poor WM can present in: losing the string of what one wants to say during a conversation, consistently losing their keys, or mobile phone, getting lost or losing directions, having many unfinished assignments, or missing deadlines frequently. We, therefore, state the need for studies from our subcontinent to focus on examining EF/WM in parents of not only typically developing children but also children with special needs.

CONCLUSION:

In sum, every parent must know the meaning, value, or importance of EF/WM both in themselves as well as their children. While there is some literature available on how parents can help their children improve the same by incorporating simple strategies into everyday life by enhancing visualization skills, trying games to practice visual memory, active reading, or playing cards, what is needed is how they can help themselves too. The need for such EF/WM training for parents of children has been recognized and needs to be undertaken in our country.

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