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Social-Learning Parenting Intervention Research in the Era of Translational Neuroscience

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Abstract

In the decades since social learning parenting interventions emerged, many evidence-based programs have been implemented at scale in community settings, and much research is now focusing on ways to maintain fidelity and impact during the implementation process. Notably, a considerable amount of theoretical confluence has occurred in parenting interventions from social learning, attachment, and other theoretical perspectives, with parent coaching as an example of this new generation of relational interventions. In addition, research examining the neurobiological effects of early adverse experiences is providing insight into key mediating and moderating mechanisms underlying the effectiveness of social learning parenting interventions, and new strategies for tailoring interventions to the needs of specific populations are being developed, making interventions more efficient, precise, and effective.

Social learning theory, which emerged in the late 1960s, is based on the premise that children acquire behavioral strategies that are modeled by significant others in their environment [1]. Laboratory studies, including the classic “Bobo doll” experiment [2], provided strong support for this assertion. This early work was complemented by evidence from investigations in naturalistic settings by Gerald Patterson and colleagues at the Oregon Social Learning Center beginning in the 1970s. These researchers focused on the emergence of childhood disruptive behavior in the family context [3]. Patterson et al. used longitudinal designs from early childhood through adolescence/adulthood and adapted ethological methodologies to create microsocial coding systems for quantifying behavior as it unfolded in real time in home environments [4]. These investigations provided the foundation for coercion theory [5], which identifies parenting practices—specifically, low rates of positive reinforcement, high rates of harsh and inconsistent limit setting, and poor monitoring of children’s behavior—associated with the development of disruptive and antisocial behavior.

Patterson and colleagues found that in families in which parents exhibited low rates of positive reinforcement and harsh discipline, aversive behavior was observed to be reciprocally reinforcing between parents and children, leading to escalating levels of negative behavior among family members over time. Young children reared in such environments were observed to exhibit low levels of prosocial behavior and high rates of

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aggression. This led to an increased likelihood of peer rejection and academic difficulties upon school entry. In adolescence, such individuals were at enhanced risk for school drop-out, substance abuse, association with deviant peers, and antisocial/delinquent behavior. In adulthood, numerous problematic (and societally costly) outcomes were observed, including propensity for incarceration, early parenthood, unemployment, and addictions and mental health difficulties.

Coercion theory has had a lasting impact not only because of its precision in providing causal linkages between early family environmental variables and the probability of an antisocial life-course trajectory, but also because the core parenting practices it describes have proved highly malleable in the context of family-based interventions [6]. A “family tree” of the social learning interventions that evolved from coercion theory include, but are not limited to, Parent Management Training-Oregon (PMTO) [7], an individual and group-based parenting program for children and adolescents; Parent–Child Interaction Therapy (PCIT) [8], which uses in-vivo coaching strategies for parents and young children; The Incredible Years (IY) [9], a parenting- and school-based intervention for preschoolers; and Treatment Foster Care Oregon (TFCO) [10], a family-based intervention for preschoolers through adolescents with severe behavior problems in child welfare and youth justice settings. Each of these interventions is supported by multiple randomized clinical trials.

The evidence base for these social learning interventions has gone beyond simply documenting impact on outcomes of interest. Randomized clinical trials (RCT’s) comprise controlled experiments that allow researchers to test, and in some instances provide validation of, the causal mechanisms stipulated by a theory. The RCT studies of social learning parenting interventions have shown [11] that changes in the key parenting practices targeted by the interventions (parental positive reinforcement, limit setting, monitoring) do indeed predict reductions in disruptive behavior and improved outcomes over the course of child and adolescent development [12]. Specifically, a meta-analysis of 54 intervention trials involving social-learning parenting produced a weighted effect size of .35 for the programs’ impacts on delinquency and antisocial behavior [13].

Current State of the Field

In the past decade empirical research on social learning parenting interventions and related topics has grown substantially. In the ensuing years, many social learning interventions were widely implemented at scales that include cities, states, and entire countries [14]. In some instances these implementations at scale have been paired with rigorous evaluations designed to replicate the original randomized clinical trials. In many instances, the RCTs of large scale implementations have yielded positive evidence of impact [e.g.,15, 16], which is noteworthy in an era in which concerns about replicability of scientific findings have become an important issue. In addition, the focus on scaling these interventions has led to the development of tools to assess implementation completion and fidelity [17, 18].

Recent developments reflect themes in the larger field of parenting intervention research. We have organized our synopsis of the state of the field into two categories: confluence with other theoretical perspectives in the development of novel intervention strategies, and

contributions from, and the potential of, translational neuroscience perspectives. These categories not only are highly interrelated, but in many instances are interdependent in terms of ongoing.

Confluence of Social Learning and Attachment Theory and Novel Intervention Strategies

One relatively recent development in the social learning parenting intervention field is its confluence with interventions that have evolved from different theoretical perspectives. Historically, for example, social learning theory and attachment theory were often deemed to be as incompatible as the behaviorist and psychodynamic intellectual traditions from which they emerged [19]. However, in the past decade the compatibility of these different perspectives has been widely discussed. For example, Patterson and Fisher noted that both attachment and coercion theory are grounded in close observation of the moment-by-moment interactions between parents and children [20]. Dozier and colleagues [21] suggested that rather than pit interventions from divergent perspectives against each other to determine which is most effective, it may be useful to view theories as complementary lenses that have more or less relevance, depending on the age and stage of development in question. As such, interventions that employ strategies derived from attachment theory and those from social learning theory may be more impactful than those from a single theoretical perspective. Evidence of the complementarity and convergence of traditionally disparate theoretical perspectives in the parenting intervention field can be derived from several sources. For example, Fisher and Kim [22] found that a social learning intervention for maltreated foster preschoolers had a significant impact on participants' secure attachment-related behavior toward caregivers. A similar finding was reported by O'Connor et al. [23] in a randomized clinical trial of a social learning intervention for 4- to 6-year-old low-income community children. It may be that interventions that target core parenting behaviors exert a cascading effect on parent-child relationship outcomes [24]. Finally, work by Bakermans-Kranenburg, Juffer and Van IJzendoorn has documented the impact of a parenting program that combines content derived from attachment theory with social learning-based strategies for behavior management [25]. As such, the field appears to be moving more toward a focus on "relational interventions" [26] rather than focusing on questions about the adequacy/superiority of a single theory.

Parent coaching, including both video coaching and live, in-vivo coaching, is one approach that has emerged during the past decade as particularly emblematic of relational interventions. Video coaching uses footage of parent-child interaction obtained in naturalistic settings (usually the home); parents review the video with a practitioner and discuss what they have observed. In some video coaching programs the video is watched in its entirety, whereas in others the video is edited to show specific interactions. Programs also vary in whether they focus only on the parent responding appropriately to the child or whether they also include missed opportunities or negative parent behavior [27]. Apart from these variations, and regardless of whether the coaching program has roots in attachment or social learning theory (or both/other theories), all approaches emphasize consistent, predictable, and responsive parenting as a key leverage point in promoting healthy

development. Not only is the emerging evidence base for video coaching quite strong, this approach also seems to be highly efficient, with programs that occur over relatively short periods of time proving to be the most effective [28].

Contributions from Translational Neuroscience

Social learning parenting interventions were among the first to incorporate neurobiological measures into the assessment protocols of randomized clinical trials. The early studies in this area provided evidence that effects of early adversity on the neuroendocrine stress-regulatory system, specifically the hypothalamic-pituitary-adrenal (HPA) axis, could be mitigated via family-based interventions [29]. Notably, attachment-based intervention studies conducted at the same time showed similar effects on HPA axis functioning [30, 31]. Although the specific mechanisms of action underlying these effects remain somewhat unclear, there is some indication that reductions in caregiver stress and the consistency/responsivity of the caregiving environment may contribute to these intervention effects [32].

Recent research in this area has progressed beyond the inclusion of neurobiological measures as outcomes in intervention studies. Figure 1 provides a conceptual model that illustrates how the original social learning intervention research, which stipulated that child outcomes might be improved by targeting malleable parenting practices known to be associated with these outcomes, has been adapted in the context of translational neuroscience. Such research considers (a) neurobiological systems known or hypothesized to be affected by (b) specific classes of adverse early experience, as mediated through (c) potentially modifiable caregiving practices to affect (d) specific child outcomes of importance.

Several directions of work show considerable promise. For example, studies examining how specific classes of stressful early experiences shape brain development are clarifying why individuals exposed to early adversity exhibit altered cognitive and social development. Numerous examples of research in this area, including work with rodents by Sullivan and Baram [33,34] and work with humans by Gee, Tottenham and colleagues [35], document how a responsive and consistent adult caregiver is a buffer against the effects of stress during a period when the immature organism lacks the capacity to mount an adequate biological or behavioral response to stress [36]. In these contexts, in addition to alterations in neuroendocrine functioning, the immune and metabolic systems are negatively affected, with lifelong consequences for inflammatory illnesses, diabetes, heart disease, and obesity [37]. In addition, the limbic threat detection system appears to mature at a faster rate, which may increase the risk for anxiety and affective disorders over the course of development [38].

Additional studies are identifying alterations in the brain and autonomic nervous system (ANS) activity of parents who provide nonresponsive or neglectful care. For example, brain imaging studies [39] show lower activation of neural reward circuitry in response to infant stimuli in the brains of neglectful mothers. Among physically abusive parents, patterns of significant coupling in their autonomic physiology and behavior while parenting suggest that it is more physiologically challenging for these parents to engage with their child in positive ways [40]. Specifically, lower respiratory sinus arrhythmia (RSA) in physically abusive

mothers appears to be associated with increased positive parenting in the moment, but subsequent increases in hostile control then immediately follow. Likewise, dynamic changes in maternal parasympathetic tone (RSA) are associated with extent of positive interactive synchrony observed in mother–preschooler interactions. Notably, a meta-analysis of research on ANS activity and parenting revealed an association between basal heart rate activity and risk for maltreatment, although there were no differences in ANS reactivity between maltreating and non-maltreating parents [41]. Together, these findings suggest a potential mediating role for brain responsiveness and autonomic functioning in the association between early experiences and parenting behavior; however, the research has produced somewhat equivocal results to date and more investigations are needed in this area.

Translational neuroscience studies can further contribute to future social learning parenting intervention research in key ways. First, knowledge about the effects of adversity on cognitive and social development may help identify putative moderators of intervention effectiveness. For example, those who derive very limited pleasure from interacting with their child may not be as responsive to conventional interventions that encourage parents to be more responsive to their child. Second, to the extent that these adversity effects are modifiable, it may become possible to develop more precisely tailored intervention strategies. For example, noting the low base rates of oxytocin in neglectful mothers, Strathearn and colleagues [42] are investigating the effects of administering intranasal oxytocin in the context of parenting interventions. This this research is ongoing and results are not yet clear; notably, there is at least some evidence that the effects of this sort of intervention are moderated by stressful early experiences, in that the least responsive individuals appear to be those parents most in need of support [43]. Third, individual differences (in terms of both genetic and temperament measures) in sensitivity to environmental influences appear to be key moderators in explaining differential responsiveness to interventions [44, 45]. As such, these variables may prove to be important in guiding research designed to increase the impact of parenting interventions.

Conclusions

For the knowledge base in this area to continue to evolve, new interventions that are being developed should be paired with methodologies for evaluating their effectiveness that are more flexible than those of traditional randomized clinical trials. Adaptive evaluation designs [46], which have existed for decades in medicine and engineering, but are only just beginning to be employed in parenting intervention research, show considerable promise. Although not without limitations, adaptive designs allow for multiple rounds of randomization in order to evaluate how to increase intervention impact for those who are not responding, to forecast risk for early treatment dropout, and generate long-term maintenance of treatment gains. They can then be used to examine how to adapt interventions in terms of dosage or modality of delivery, or how to pair them with other strategies, to be maximally effective.

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- Social learning interventions are among the most successfully scaled parenting interventions.
- There is increasing integration in the theoretical perspectives underlying parenting interventions, especially in the area of attachment and social learning theory.
- Research on the effects of early life stress on biobehavioral development helps explain the attention and self-regulation difficulties observed among children who have experienced non-responsive parenting.
- Social learning parenting interventions that are informed by the neurobiological effects of early stress have the potential to improve outcomes for children from the most disadvantaged backgrounds.

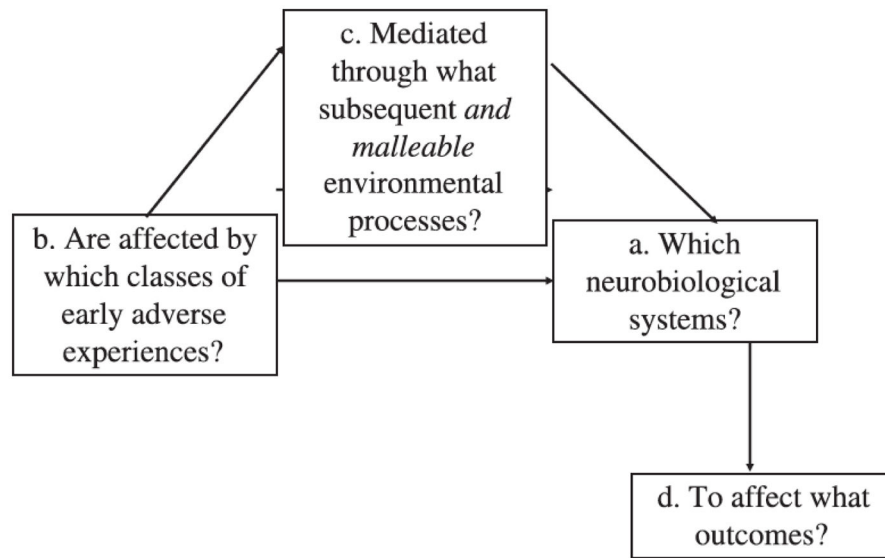


Figure 1. Conceptual model for integrating neurobiological systems into social learning parenting intervention research.