



# Callous-Unemotional Traits and Effortful Control Mediate the Effect of Parenting Intervention on Preschool Conduct Problems

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## Abstract

Parenting intervention (PI) is an effective treatment for children's conduct problems (CP) that has been shown to be mediated by improved parenting practices and parenting self-efficacy. Recently, *Hitkashrut's* randomized controlled trial demonstrated that ineffective parenting (IP) mediated effects on callous-unemotional (CU) traits and effortful control (EC), while controlling for more general treatment effects on CP. These temperament and personality-based features predict the formation of early-onset antisocial trajectories with poor long-term prognosis. The objective of this study was to use *Hitkashrut's* 3-wave dataset to test posttreatment EC and CU mediation of treatment effect on 1-year follow-up CP, and to determine whether mediation by each child-level potential mediator remains significant when tested concurrently with the parenting mediator. Parents of 209 3–5 year-old preschoolers (163 boys; 46 girls), with subclinical-clinical range CP were assigned to 14-session co-parent training groups ( $n = 140$  couples), or to minimal intervention control groups ( $n = 69$  couples). Assessments were based on both parents' questionnaires. An intent-to-treat analysis showed that EC and CU traits simultaneously mediated treatment effects on CP in one EC/CU mediational model. The concurrent testing of child- and parent-level mediators showed mediation by IP and CU traits in the CU/IP model, and IP mediation in the EC/IP model. Similar results were obtained in mediational analyses that controlled for the shared variance between the mediators and CP at T2. Overall, the findings support an intervention model of coaching parents of high-CP children to promote moral self-regulatory competencies while concurrently applying behavioral methods that directly target CP.

**Keywords** Conduct disorders · Parent training · Callous-unemotional traits · Effortful control · Socioemotional competencies

Behavior-focused parenting intervention (PI) based on social learning theory is a well-established treatment for conduct problems (CP) in early and middle childhood and its effectiveness has consistently been demonstrated in real-world practice contexts (Michelson et al. 2013; Kaminski and Claussen 2017). Both positive and negative parenting have been found to mediate PI's effects on child CP (Forehand et al. 2014). Recently, *Hitkashrut's* randomized controlled trial (RCT) demonstrated that in addition to mediating the effect on CP (Somech and Elizur 2012), ineffective parenting (IP) also mediated PI's effect on preschoolers' (ages 3–5) effortful control (EC) and callous-unemotional (CU) traits (Elizur et al. 2017).

These effects were significant when controlling for the more general treatment effect on CP. EC and CU traits are two early temperament and personality-based features that play a pivotal role in developmental pathways of childhood-onset disruptive disorders (Frick 2012). At preschool age, the EC mediator indicates children's top-down self-regulation ability to modulate emotion, cognition, and behavior by inhibiting a dominant response and/or activating a non-dominant response. The CU mediator, which is associated with early conscience, indicates the child's position on a range from empathic-prosocial (i.e., concern for others, feeling guilty when acting wrong, admitting wrongdoing, and apologizing) to callous-uncaring (i.e., lack of care about hurting others, lack of care about being in trouble, and indifference toward others' feeling). Research on young children showed that EC and CU traits can be reliably assessed, are moderately stable and moderately correlated, and have unique predictive effects on later CP (Kimonis et al. 2016; Waller et al. 2017; Waller et al. 2015).

The current study pursues these analyses by examining a theory-based hypothesis that *Hitkashrut's* intervention

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activated an indirect child-level mediated effect on CP in addition to the direct treatment effect. More specifically, we hypothesized that improvement in EC and CU traits partially mediated treatment effect on CP. Although EC and CU are associated, each variable indicates a different set of socioemotional characteristics. Hence, both mediational paths were expected to be significant when tested in a single mediational model. Following the finding of IP mediated treatment effects on EC, CU, and CP, the current study also examines whether child-level mediation would be independent of parent-level mediation when both types of mediators are tested in one mediational model. Such mediational analyses are considered a first step in testing the plausibility of a hypothesized mechanism of change (Kazdin 2007). Developmental models and community-based longitudinal research of young children's conscience and self-regulation support the socioemotional path hypothesis (Eisenberg et al. 2010; Eisenberg et al. 2015; Johnson et al. 2017; Kochanska and Aksan 2006). Although the hypothesized EC/CU mediation of PI's effect on CP has not yet been demonstrated by a PI RCT, it is supported by previous intervention studies. EC was shown to mediate the family check-up's long-term effects on peer preference (Chang et al. 2017). Furthermore, the addition of a child-focused emotion recognition component targeting CU associated social-cognitive deficits to PI, significantly increased treatment effect on high-CU children beyond the effect of PI only (Dadds et al. 2012).

During the preschool years, rapid development in physical and cognitive abilities challenges parental management of children's behaviors (Shaw and Shelleby 2014). At the same time, two inner control systems develop that enable children to regulate behavioral impulses and follow an internalized compass that consists of moral emotions and a moral self-concept (Kochanska et al. 2009). The top-down competencies of which these systems are composed prevent disruptive developmental trajectories (Eisenberg et al. 2010; Kochanska and Aksan 2006; Thompson 2014). The two systems are interrelated and their development in young children is manifested in committed compliance, internalized rule-compatible conduct, and concern about transgressions. However, high-CU and low-EC children are more difficult to socialize and their dispositional traits appear to impede the development of moral self-regulatory competencies. High-CU children tend towards low-level responsiveness to punishment cues, little empathy for others' distress, and fearlessness, while low-EC children tend towards impulsivity, low ability to delay gratification, and emotional reactivity (Frick 2012; Frick et al. 2014; Goffin et al. 2017).

Fortunately, developmental research indicates that parents can foster young children's socioemotional competencies to reduce risk for disruptive disorders deriving from early temperament and personality dispositions. Generally, warm, supportive, and mutually responsive parent-child relationships

promote self-regulation and moral development (Eisenberg et al. 2010; Kochanska and Aksan 2006; Thompson 2014). Furthermore, these positive parent-child relationship qualities can reduce the negative impact of high-CU and low-EC features on the development of self-regulation and conscience (Kochanska and Kim 2013, 2014; Kochanska et al. 2013). However, parental socializing influence decreases when parents become entangled in coercive and dysregulated interactions with temperamentally fearless, emotionally dysregulated, and low-empathy children (Hawes et al. 2011; Patterson et al. 2010). As this mutually escalating process continues, parenting becomes negatively imbalanced; coercive sequences increase while positive parenting is reduced. Authoritarian, coercive, and inconsistent parenting contribute to increasing crystallization of high-CU and low-EC characteristics, and to the evolution of antisocial pathways characterized by poor long-term prognosis (Frick 2012; Waller et al. 2013; Waller et al. 2015).

Reviews of PI's effectiveness and the mediating role of parenting suggest that coercive family processes can be disrupted and parent-child relationships rebalanced, thus setting off a change process that improves children's behavior (Forehand et al. 2014; Michelson et al. 2013). There is increasing evidence in the last decade that PI with young children can also influence EC/CU features. Reviews of PI's effect on CU traits conclude that early intervention is more likely to ameliorate the callous dimension (Hawes et al. 2014; Waller et al. 2013), while RCTs that were initiated at ages 2–7 demonstrated PI's effects on different indices of self-regulation, i.e., inhibitory control (Chang et al. 2014), inattentive and hyperactive/impulsive difficulties (McGilloway et al. 2012), ADHD diagnosis (Conduct Problems Prevention Research Group 2011), and EC (Chang et al. 2017; Elizur et al. 2017).

The socioemotional path hypothesis tests a basic premise in *Hitkashrut's* design. *Hitkashrut* is a group-based secondary prevention program that was created for parents of 3–5 year-olds with subclinical-clinical range CP, and theoretically anchored in attachment, social interaction, and family-systems theories (Somech and Elizur 2012). The purpose was to pre-empt dysfunctional processes that characterize children, parents, and teachers who become entangled in mutually escalating interactions. It was assumed that an integrated behavior- and socioemotional-focused PI would achieve maximum impact on children's character during the preschool years, when a sense of agency is emerging (McAdams and Olson 2010), and that this effect would in turn inhibit CP. Consequently, *Hitkashrut* implemented a broad two-pronged approach of addressing diverse psychological and neurobiological profiles that are partly overlapping before crystallizing into distinct antisocial trajectories (Cross et al. 2014). The intervention integrates behavior-focused contingencies and disciplinary practices

that directly target CP by reducing IP and by coaching effective practices (Michelson et al. 2013; Patterson et al. 2010), together with socioemotional-focused methods that promote children's self-regulatory and prosocial competencies (Duncombe et al. 2016; Johnson et al. 2017). This broad approach is focused both on the reduction of risk and the promotion of competencies.

*Hitkashrut's* integrated targeting of both self-regulation and prosocial competencies is supported by findings of interactions between these two inner control systems during early childhood. Kochanska et al.'s (2009) research suggests that moral emotions, particularly guilt, may inhibit CP regardless of child top-down EC capacity, through an automatic inhibitory response due to negative arousal triggered by memories of past wrongdoing. On the other hand, high EC capacity enables high-CU children to exercise deliberate restraint that may offset risk for CP conferred by low-level guilt. For these children, the EC inhibitory capacity can serve a protective function that facilitates the consideration of consequences, social and family standards, and past socialization messages. Similarly, Waller et al. (2017) found that age 3 interactions between executive function and CU traits predicted age 10 aggression. High executive function protected high-CU children from later CP. At the same time, the combination of high CU behaviors and low executive function predicted the highest level of age 10 CP. Consequently, Waller et al. suggested the integrated strategy that is tested in the current intervention study.

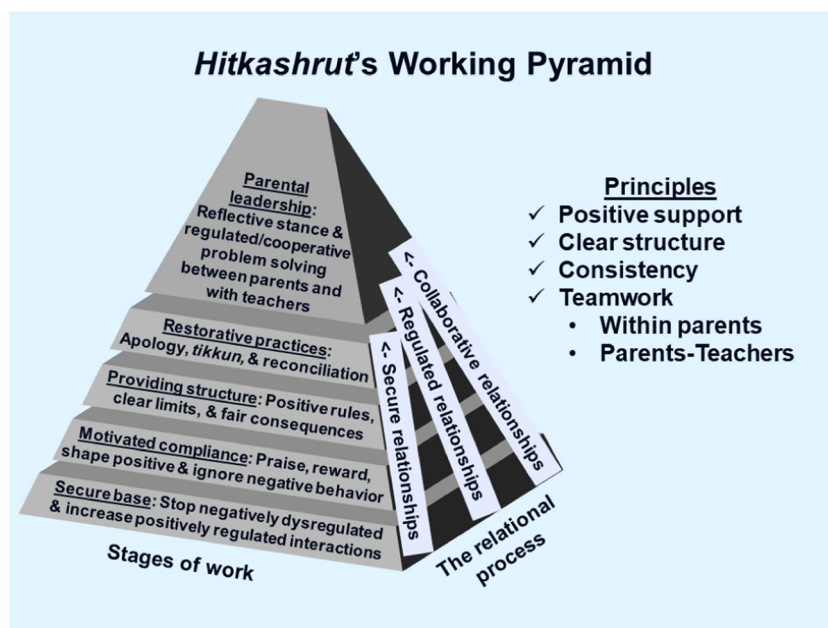
To illustrate, *Hitkashrut* attempts to activate the hypothesized socioemotional mechanism by utilizing a psychoeducational reframing of the referred children as “orchids” who are highly sensitive to the fit between parenting practices and their unique developmental needs (Bakermans-Kranenburg and van IJzendoorn 2015). This reframing reduces guilt and shame, and serves to introduce *Hitkashrut* as a parent-supportive skill-enhancing program that helps parents nurture their children's character strengths. Once the alliance is secured, the parents are challenged to shift from accommodating and/or coercive positions to a relational perspective by changing their cognition, emotional expression, and behavior. Specifically, parents are coached in methods that increase security, regulation and cooperativeness in the parent-child, co-parent, and parent-teacher relationships. *Hitkashrut's* working pyramid (Fig. 1) illustrates how the behavior and socioemotional foci are intermixed throughout different stages of intervention that promote behavior change, emotion regulation, and prosocial orientation. For example, parents are trained to use play, positive behavior support, socioemotional-focused storytelling with externalizing metaphors, effective discipline, and restorative practices that promote moral standards. Most importantly, they learn to tune into their children's and their own emotional thermometers in order to pre-empt “hot”

escalating interactions, utilize mutual calming time respites, and gradually promote prosocial cooperativeness. Fathers' participation, which is underutilized in PI programs despite robust evidence of its impact (Panter-Brick et al. 2014), is a precondition that facilitates cooperative implementation and relational realignments. For a more detailed illustration of *Hitkashrut's* two-prong behavior- and socioemotional-focused approach see “Tommy Turtle's brainpower”: a children's story with adult guidelines that models the procedures of calming time and apology, *tikkun* (rectification), and reconciliation (Elizur 2016).

Given *Hitkashrut's* positive effects on CU traits and EC, and taking into account that the internal logic of the intervention privileges the promotion of prosocial self-regulation, the question remains whether CU traits and EC are implicated as conjoint mediators that account for the efficacy of the program. In line with MacKinnon et al. (2007), we tested the EC/CU mediational model with the following set of hypotheses: (a) treatment is positively associated with EC and negatively associated with CU at posttreatment (T2); (b) EC at T2 is negatively associated with CP at 1-year follow-up (T3), while CU at T2 is positively associated with CP at T3; and (c) EC and CU at T2 mediate treatment effect on CP at T3. We used baseline (T1) scores to control for temporal stability of all variables. Following Kazdin's (2007) argument that testing multiple mediators benefits the exploration of change mechanisms by checking for specificity (i.e., the process responsible for treatment change), and MacKinnon et al.'s suggestion that multiple-mediator models provide a more accurate assessment of mediation, we tested both potential mediators in one structural model. We expected mediation to be partial rather than full; i.e., a significant treatment effect on CP at T3 in addition to the EC/CU mediated effects on CP at T3. Partial mediation would be in line with *Hitkashrut's* two-pronged approach that suggests both a direct behavioral effect on CP and an indirect socioemotionally-mediated effect. Previous analyses supported this hypothesis. *Hitkashrut's* effect on CP at T2 was independent of effects on EC and CU traits (Elizur et al. 2017). A similar effect on CP at T3 was shown in an analysis that did not control for treatment effects on CU traits and EC (Somech and Elizur 2012).

Since sample size did not allow for a 3-mediator model, we used 2 parallel EC/IP and CU/IP mediated models to test whether the child-level variables and IP concurrently mediated treatment effect on CP. The hypothesized paths effects were: (a) treatment is associated with T2 child features (positive association with EC / negative association with CU) and negatively associated with IP at T2; (b) T2 child features are associated with CP at T3 (negative association with EC / positive association with CU), while IP at T2 is positively associated with CP at T3; and (c) T2 child feature (EC or CU) and IP mediate treatment effect on CP at T3.

**Fig. 1** *Hitkashrut's* working pyramid. *Note.* A distinct restorative practices stage was designed following *Hitkashrut's* RCT and it reflects an increased emphasis on these practices, which were previously interspersed throughout the program



## Method

### Participants

The sample of 209 families, recruited during 2006–9, was composed of 163 boys and 46 girls, 32–64 months at pretest ( $M = 48.63$ ,  $SD = 7.20$ ). Preschool teachers rated all their 3–5 year-old children on the CP subscale of the Strengths and Difficulties Questionnaire (Goodman and Scott 1999), and referred children with significant disruptive behaviors. Thus, 84.6% were in the subclinical-clinical range (above percentile 80), with no significant difference between study groups. Subsequently, the facilitators interviewed all parents, discussed the program and its requirements, stressed the need for the two caregivers' regular attendance, and screened out children with significant intellectual impairment or pervasive developmental delay, as well as unmotivated or highly conflicted parents.

The sample was composed mostly of intact families (86.6%). The 21–50 year-old mothers ( $M = 33.46$ ,  $SD = 4.76$ ) and 23–61 year-old fathers ( $M = 36.48$ ,  $SD = 5.99$ ) were born in Israel (78%), Europe (7.7%), North America (5.6%), South America (3.9%), and Africa (4.8%). All participants were Jewish of different affiliations: 19% ultra-orthodox, 20% orthodox, 23.5% traditional, and 36.5% secular. Most parents were employed or in Yeshivas (Jewish educational institutions of higher learning): 94.3% fathers, 89% mothers. Education: high-school degree (55.5% fathers, 49.3% mothers), college (14.8% fathers, 26.3% mothers), and higher degrees (18.7% fathers, 17.2% mothers). Monthly income per family: 54% low to very low (less than \$2850), 39.7% average (\$2850–\$5700), and 6.2% high (> \$5700).

### Procedure

The Ministry of Education's Chief Scientist and the Hebrew University's Institutional Review Boards approved *Hitkashrut's* RCT. The intervention was implemented by locally employed educational psychologists in three cities who scheduled interviews with parents during which program information was provided and forms of informed consent explained and then signed by both parents. Participants were randomly allocated to intervention ( $n = 140$ ) or to control (minimal treatment) ( $n = 69$ ) groups using random numbers. The 2:1 assignment ratio was predicated on a preference for enabling more participants to take advantage of the intervention without a serious loss of statistical power. Potential harm to participants was minimized by implementation within the practice context of services that provided more intensive interventions or made referrals to public clinics where necessary.

Graduate psychology students made home visits to collect identical sets of questionnaires from both parents. The treatment condition was masked. All variables were assessed at T1 and T2, while CP was the only variable that was assessed at T3 in both control and treatment groups. Posttreatment assessment included 182 families (87.08%): 125 intervention (89.3%) and 57 control (82.6%). Follow-up assessment included 125 families (60%): 96 intervention (68.6%) and 29 control (42%). T-tests comparisons between the completers vs. noncompleters groups at T2 [CP ( $t = -0.62$ ), EC ( $t = 0.73$ ), CU ( $t = -0.96$ )] and the completers vs. noncompleters groups at T3 [CP ( $t = -1.11$ ), EC ( $t = 0.07$ ), CU ( $t = -0.16$ )] were all nonsignificant ( $p > 0.05$ ) with respect to each baseline variable. For the flow chart and additional details about the RCT, trial registration, and conformity with the CONSORT checklist, see Somech and Elizur (2012).

**Intervention** Two masters-level psychologists co-facilitated 14 2-hour weekly meetings with 5–7 couples. An emotionally supportive and empowering group process that combats helplessness and facilitates reconnection with feelings of parenting competence was established through psychoeducational interventions. Subsequently, the parents completed a semi-structured manualized training sequence. Parental self-regulation, couple teamwork, security, and cooperation on all levels of the system (i.e., parent-child, parent-teacher, and between parents) were a continuous theme throughout the program. For more details about the intervention, see Somech and Elizur (2012).

**Minimal Intervention Control Group** The parents were referred for two consultation sessions. The facilitators made use of *Hitkashrut's* key components and handouts, and when necessary referred parents to the local educational psychology service or community clinics.

**Training, Supervision and Treatment Integrity** The Psychological Services' directors selected facilitators with preschool experience and group facilitation skills. These facilitators attended a 2-day training workshop and during the course of the intervention had regular bi-weekly supervision. Newly trained facilitators were paired with experienced facilitators. The facilitators worked from a detailed manual with guidelines and materials that specified each sessions' objectives and layout, including a slide presentation, video clips, structured demonstrations, role-plays, and take-home handouts. To ensure program adherence and fidelity, each supervisory session began with a report on the implementation of the previous sessions, followed by a discussion of specific problems or issues (e.g., lateness, reservations concerning contingency management, and disrespectful spouse communication). Parent attendance was high: 100% of the mothers and 86% of the fathers attended 10–14 sessions. The high attendance was apparently related to the screening procedure, the public funding of the intervention, the insistence on co-parent participation, and between-sessions telephone calls.

## Measures

We used previously translated Hebrew-validated questionnaires except for the Eyberg child behavior inventory and the inventory of CU that were translated for the purpose of this study by two bilingual professionals using the back-translation procedure. We used 5-point Likert scales unless specified otherwise. Following Kimonis et al. (2016), we used a resolved score procedure to circumvent potential underreporting of child problems. Parents' scores were combined in a conservative fashion by taking the higher rating of child problems between raters.

**Demographics** The pretreatment characteristics of participants: Child age and sex, family status, income, parents' age, country of birth, educational level, and employment status.

**Effortful Control** This was assessed by an 18-item 7-point version of the Child Behavioral Questionnaire (Rothbart et al. 2001) for ages 3–4. We used 3 scales: inhibitory control (behavior regulation; e.g., "Is good at following instructions"), attention focusing (task concentration; e.g., "When picking up toys, usually keeps at the task until it's done"), and attention shifting (moving attention from one activity to the next; e.g., "Has an easy time leaving play to come to dinner"). (Cronbach's alpha = 0.82).

**Callous-Unemotional Traits** This was assessed by 11 commonly used items in CU traits' assessment of preschoolers (Cronbach's alpha = 0.82). There were 7 empathic-prosocial items and 4 callous items. We excluded the unemotional factor, which has low reliability and poor correlations with external correlates, and used the more psychometrically sound two-factor model that was reconfirmed with young children (Kimonis et al. 2016; Willoughby et al. 2015). There were eight items from Frick's (2004) Inventory of Callous-Unemotional traits (ICU), Parent Report (Preschool Version) (e.g., "Does not care who s/he hurts to get what s/he wants"), and 3 APSD for prekindergarten items from Dadds et al.' (2005) community study (e.g., "Feels bad or guilty when s/he does something wrong").

**Conduct Problems** The 36-item Eyberg Child Behavior Inventory (ECBI) is a validated measure of child behavioral problems that correlates with behavioral observations and differentiates between clinic-referred and control children (Robinson et al. 1980). (Cronbach's alpha = 0.89).

**Negative/Inconsistent Parenting** We used the Preschool Revised Alabama Parenting Questionnaire, which was shown to fit preschool samples (Clerkin et al. 2007), to assess both negative/inconsistent practices (e.g., "You threaten to punish your child and then do not actually punish him/her"; "Your child talks you out of being punished after he/she has done something wrong") (Cronbach's alpha = 0.66).

**Parental Distress** We used two of the 3 subscales of the research validated 36-item Parental Stress Index-Short Form (PSI-SF) (Abidin 1990): Parental distress (e.g., "I feel trapped by my responsibilities as a parent") and perceptions of stressful interactions with the child (e.g., "My child rarely does things for me that make me feel good"). We did not use the perception of the child as "difficult" subscale since it confounds with CP (Cronbach's alpha of 24 items = 0.85).

**Parental Helplessness** We used a 9-item measure that was developed and validated in Israel and adapted for parents of preschoolers in communication with the authors (Weinblatt and Omer 2008) (e.g., “I have no influence over my child”; “my child rules the house; he is stronger than me”, and “I feel helpless when my child loses his/her temper”). (Cronbach’s  $\alpha = 0.90$ ).

**Ineffective Parenting** This latent factor was indicated by negative/inconsistent parenting and perceived parenting inefficacy. Perceived parenting inefficacy is an index created by aggregating the highly correlated scales of parental distress and parental helplessness (respectively for Time 1 and 2:  $r = 0.74, .73, p < 0.001$ ). The correlation between negative/inconsistent parenting and perceived parenting inefficacy is 0.45 at Time 1 and 0.55 at Time 2, amounting to a reliability of 0.62 and 0.71, respectively.

### Data Analysis

The mediational models were tested by structural equation modeling using an intent-to-treat model to avoid selection biases associated with level of treatment participation. The estimation of each model applied the maximum likelihood method with the Yuan and Bentler (2000) EM-ML imputation procedure for missing data. The imputation procedure provided a total sample of 209 respondents. As required in estimating longitudinal models, we allowed error terms for repeated measures to correlate and constrained the loadings of same indicators of parallel latent factors to be equal over time. We followed Kline’s (2015) model fit recommendation to consider models with CFI and NNFI indices that exceed 0.90 and RMSEA less than 0.08 as providing reliable evidence of acceptable fit. To test mediation, we examined both the direct treatment effect on outcome and the indirect path effects; i.e., treatment effects on mediators and mediators’ effects on the outcome (MacKinnon et al. 2007). We used the RMediation package to test the significance of each mediated path. RMediation, which uses the distribution of the product term, provides accurate confidence limits for mediated effects that are similar to those provided by bootstrap methods (Tofighi and MacKinnon 2011).

### Results

Table 1 presents the means, standard deviations of the key measures at T1, T2, and T3. ANCOVA group comparisons at posttreatment indicated significant intervention effects on all outcome variables. Subsequent planned *t*-tests within the intervention group showed significant posttreatment improvement in all child and parent variables: CP [ $t(140) = 10.48, p < 0.00$ ] and CU traits [ $t(140) = 8.19, p < 0.00$ ] decreased,

and EC increased [ $t(140) = -5.24, p < 0.00$ ], while perceived parenting inefficacy [ $t(140) = 9.46, p < 0.00$ ], and negative/inconsistent parenting [ $t(140) = 9.12, p < 0.00$ ] decreased. The control parents reported a significant decrease in CP [ $t(69) = 2.08, p < 0.05$ ], and nonsignificant change in EC [ $t(69) = -0.91, p > 0.05$ ], CU traits [ $t(69) = -0.81, p > 0.05$ ], perceived parenting inefficacy [ $t(69) = 0.42, p > 0.05$ ], and negative/inconsistent parenting [ $t(69) = 0.64, p > 0.05$ ]. Planned post-intervention to follow-up *t*-tests revealed nonsignificant changes in CP in both intervention [ $t(96) = -0.95, p > 0.05$ ] and control groups [ $t(29) = -0.65, p > 0.05$ ]. Follow-up ANCOVA group comparison showed significant intervention CP effects with baseline CP as covariate [ $F(1, 129) = 5.13, p < 0.05$ ].

### Measurement Models

IP was indicated by negative parenting practices and perceived parenting inefficacy, while EC, CU traits, and CP were each indicated by two parcels following Russell et al.’s recommendations (Russell et al. 1998). Parceling is advantageous in small-sample analyses when a set of items is assumed to be unidimensional (Kline 2015). This strategy has the advantage of creating indicators that have more acceptable distribution properties, such as less skewness and better approximation to a normal distribution. In this way, the need for including unique unpredictable correlated errors among single item indicators is eliminated and Heywood effects may be prevented. Following an exploratory factor analysis using maximum likelihood extraction, we allocated items to parcels according to rank order of factor loadings (Bandalos 2002): pairs of highest and lowest items were assigned to each parcel in order to equate average loadings. Confirmatory factor analysis showed a good fit to the data for each of the measurement models: EC/CU mediated model [ $\chi^2(45, N = 209) = 93.01, p = 0.00; NFI = 0.93; NNFI = 0.94; CFI = 0.96; RMSEA = 0.072$ ], EC/IP mediated model [ $\chi^2(45, N = 209) = 67.47, p = 0.02; NFI = 0.95; NNFI = 0.97; CFI = 0.98; RMSEA = 0.05$ ], and CU/IP mediated model [ $\chi^2(45, N = 209) = 96.15, p = 0.00; NFI = 0.92; NNFI = 0.93; CFI = 0.96; RMSEA = 0.07$ ]. All factor loadings in these models were substantial, statistically significant, and in the expected direction.

### The Mediational Models

Fig. 2 presents the results of testing the EC/CU mediational model. Consistent with the research hypotheses, as Fig. 2 illustrates, all the following predictions were significant: (a) treatment was negatively related to follow-up CP; (b) treatment was positively related to posttreatment EC; (c) treatment was negatively related to posttreatment CU traits, (d) posttreatment EC was negatively related to follow-up CP; and (e) posttreatment CU was positively related to follow-up CP.

**Table 1** Means and Standard Deviations of Study Variables and Posttreatment Intervention Effects

Variable	Treatment			Control			ANCOVA <i>F</i> (1, 206)
	T1 <sup>a</sup> <i>M</i> ( <i>SD</i> )	T2 <i>M</i> ( <i>SD</i> )	T3 <i>M</i> ( <i>SD</i> )	T1 <i>M</i> ( <i>SD</i> )	T2 <i>M</i> ( <i>SD</i> )	T3 <i>M</i> ( <i>SD</i> )	
Child CP	110.65 (13.12)	96.26 (16.02)	96.18 (17.24)	109.17 (15.13)	105.94 (13.83)	101.65 (20.84)	27.10*
Child CU traits	34.84 (6.37)	30.54 (6.45)		34.10 (5.54)	34.79 (5.79)		25.32*
Child EC	3.87 (0.78)	4.21 (0.81)		3.80 (0.77)	3.88 (0.60)		11.39*
Parental distress	2.22 (0.39)	1.96 (0.38)		2.18 (0.38)	2.13 (0.37)		19.45*
Parental helplessness	2.15 (0.59)	1.76 (0.51)		2.10 (0.64)	2.11 (0.65)		27.83*
Negative/Inconsistent parenting	2.43 (0.40)	2.11 (0.41)		2.37 (0.42)	2.34 (0.39)		26.14*

Sample size for ITT design: treatment, *n* = 140; control, *n* = 69

<sup>a</sup> Nonsignificant differences between groups on all baseline variables

\**p* < 0.001

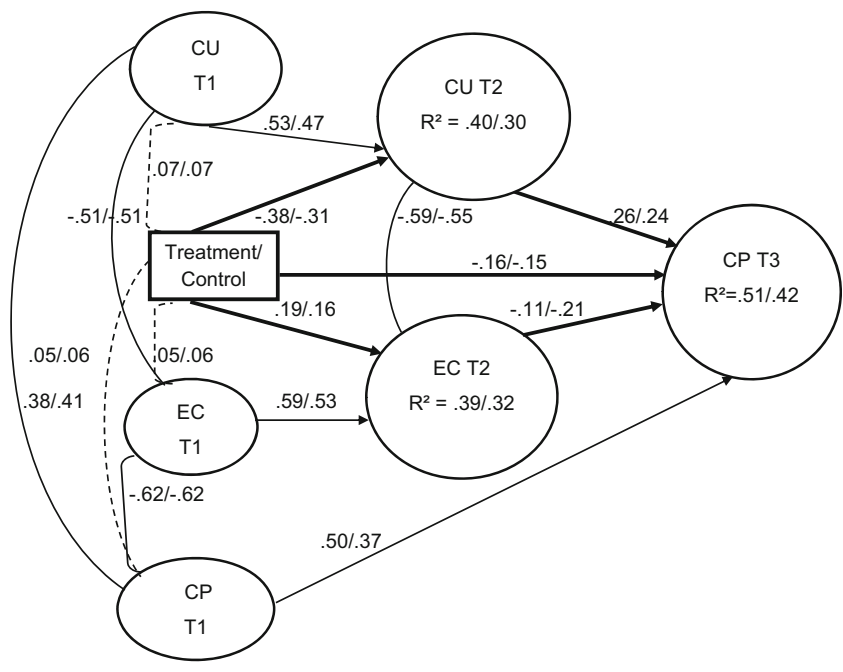
The significance of the mediational paths was tested with the RMediation package by computing the distribution of the product of coefficients method using 95% confidence limits for each indirect effect (Tofighi and MacKinnon 2011). The indirect effect that indicates mediation is significant when zero is not included within confidence limits. RMediation showed that both mediational paths were significant. The indirect effect estimates are 17.57 (SE = 1.78) for CU and -11.39 (SE = 2.2) for EC. The confidence intervals are -21.15 to -14.77 for CU mediation, and -15.72 to -7.10 for EC mediation.

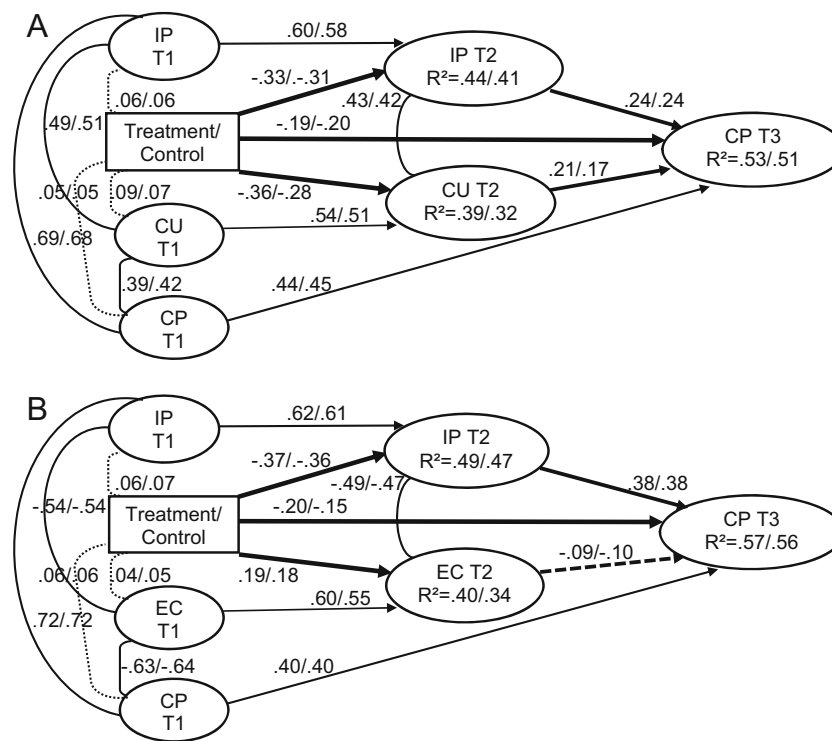
A post-hoc analysis tested whether EC/CU mediation could be explained by CP change at T2. We removed the variance in the mediators at T2 that was due to their status on CP at T2. Confirmatory factor analysis showed a good fit to the data for the measurement model. The results of the

controlled and uncontrolled model were equivalent (see Fig. 2). RMediation showed that both mediational paths were also significant in the controlled model. The indirect effect estimates are 16.80 (SE = 1.88) for CU and -10.54 (SE = 2.2) for EC. The confidence intervals are -20.57 to -13.20 for CU mediation, and -14.77 to -6.35 for EC mediation.

Figure 3 presents the results of testing the CU/IP and EC/IP mediational models. The following paths were significant in the CU/IP model: (a) treatment was negatively related to follow-up CP; (b) treatment was negatively related to post-treatment CU; (c) treatment was negatively related to post-treatment IP; (d) posttreatment IP was positively related to follow-up CP; and (e) posttreatment CU was positively related to follow-up CP. RMediation showed that both IP and CU mediational paths were significant. The indirect effect

**Fig. 2** Test of EC and CU as concurrent mediators of treatment effect on CP with/without control for CP at T2. *Note.* Results for the structural model without and with control for the shared variance between CU/EC at T2 and CP at T2 are on the left and right side of the slash, respectively. Bold arrows represent hypothesized mediational paths; full arrows represent significant paths (*p* < 0.05); dashed lines represent nonsignificant associations (*p* > 0.05). Path coefficients are standardized. In the interest of clarity, error terms are not displayed. Goodness-of-fit measures showed an excellent fit to the data: NFI = 0.94/.94, NNFI = 0.96/0.95, CFI = 0.98/0.97, RMSEA = 0.055/0.064, Yuan-Bentler Chi-square  $\chi^2$  (48df *N* = 209) = 78.40/88.27, *p* = 0.00





**Fig. 3** Tests of IP and (a) CU or (b) EC as concurrent mediators of treatment effect on CP. *Note.* Results for the structural model without and with control for the shared variance between CU/EC at T2 and CP at T2 are on the left and right side of the slash, respectively. Bold arrows represent hypothesized mediational paths; full arrows represent significant paths ( $p < 0.05$ ); dashed lines represent nonsignificant associations ( $p > 0.05$ ). Path coefficients are standardized. Goodness-of-

fit measures showed an excellent fit to the data. IP/EC model: NFI = 0.95/0.95, NNFI = 0.98/0.98, CFI = 0.99/0.99, RMSEA = 0.04/0.04 Yuan-Bentler Chi-square  $\chi^2$  (48df  $N = 209$ ) = 63.21/64.59,  $p = 0.07/0.06$ . IP/EC model: NFI = 0.96/0.95, NNFI = 0.99/0.98, CFI = 0.99/0.99, RMSEA = 0.02/0.04, Yuan-Bentler Chi-square  $\chi^2$  (48df  $N = 209$ ) = 51.63/63.78,  $p = 0.33/0.06$

estimates are  $-18.40$  ( $SE = 8.91$ ) for IP and  $-15.60$  ( $SE = 1.80$ ) for CU. The confidence intervals are  $-35.87$  to  $-0.94$  for IP mediation, and  $-17.09$  to  $-12.19$  for CU mediation. The following paths were significant in the EC/IP model: (a) treatment was negatively related to follow-up CP; (b) treatment was positively related to posttreatment EC; (c) treatment was negatively related to posttreatment IP; and (d) posttreatment IP was positively related to follow-up CP. Although posttreatment EC was negatively related to follow-up CP, the association was nonsignificant. Consequently, only IP mediation was tested in this model and RMediation showed that it was significant. The indirect effect estimate is  $-26.72$  ( $SE = 11.82$ ) and the confidence interval is  $-49.90$  to  $-3.54$ .

A post-hoc analysis of both models was performed after removing the variance in the mediators at T2 that was due to their status on CP at T2 in order to control for the possibility that mediation could be explained by the concurrent CP change at T2. The results presented in Fig. 3 showed that the controlled and uncontrolled models were equivalent. RMediation showed that both IP and CU mediational paths were significant in the controlled CU/IP model. The indirect effect estimates are  $-18.27$  ( $SE = 7.99$ ) for IP and  $-13.46$  ( $SE = 1.52$ ) for CU. The confidence intervals are  $-33.93$  to  $-2.62$  for IP mediation, and  $-16.52$  to  $-10.54$  for CU

mediation. RMediation also showed significant IP mediation in the controlled EC/IP model. The indirect effect estimate is  $-25.60$  ( $SE = 11.44$ ) and the confidence interval is  $-48.04$  to  $-3.18$ .

## Discussion

The finding that posttreatment EC and CU traits simultaneously mediated treatment effect on follow-up CP supports the hypothesis that PI can inhibit disruptive behaviors by strengthening the two inner control systems that are associated with these mediators. The partial mediational paths suggest that treatment has both a direct effect on CP and an indirect child-level mediated effect. The finding of equivalent results in a post-hoc analysis that controlled for the shared variance between the mediators and CP at T2, increases confidence that change in children's EC/CU features rather than CP mediated treatment effect. The consideration of these results together with previous findings of IP mediated effects on CP, EC and CU traits (Elizur et al. 2017), supports *Hitkashru's* two-prong behavior- and socioemotional-focused strategy of change.

The additional finding that posttreatment CU traits and IP concurrently mediated treatment effect on follow-up CP in



both the CP-controlled and uncontrolled model suggests that PI can take advantage of a window of opportunity for parents during the preschool years in order to promote moral self-regulatory competencies that inhibit CP. During this period, children begin to articulate their values, motives, and strivings, and gradually develop characteristic patterns of adapting to the environment (McAdams and Olson 2010). This second layer personality development involves a complex interplay between first layer dispositional traits that reflect genetically driven differences and socialization in the child's close environment. Parents have greater leverage on the transformation of genotypes into phenotypes that occurs at this phase than on dispositional traits, such as CU associated fearlessness and low-level responsiveness to punishment cues (Eisenberg et al. 2015). Early conscience is an important component in the evolving personality system. It encompasses a moral self-concept (i.e., self-perception on moral dimensions) that guides children's conduct in a way that is consistent with their view of themselves, together with emotional, cognitive, and executive self-regulatory mechanisms (Kochanska and Aksan 2006; Thompson 2014). Indeed, intervention research indicates that early personality malleability can be utilized to buffer risks associated with CU dispositional vulnerabilities (Hawes et al. 2014; Waller et al. 2013).

The testing of the EC/IP model showed that EC ceased to be an independent mediator when considered together with the significant parenting mediator. We interpret this result in reference to the shared variance between the child- and parent-level variables. At an early age, self-regulation is largely influenced by “co-regulation” provided by caregivers, whose support, coaching, and modeling promote children's ability to understand, express, and modulate thoughts, feelings, and behavior (Murray et al. 2015). Conversely, children's dysregulation reflects not only their disposition but also the effect of escalating interactions, associated with parental coercion, negative/inconsistent practices, and emotional reactivity (Patterson et al. 2010). *Hitkashrut*'s reduction of IP, which was found to mediate treatment effect on EC (Elizur et al. 2017), apparently reflected the decrease in these “co-dysregulation” cycles. Classroom behavioral management programs operate in a parallel way to prevent escalating conflicts and high-level arousal in the emotion and stress response systems that derail children's regulatory abilities and fuel negative affect, impulsivity, and oppositionality (Ursache et al. 2012). Subsequently, they shape a more secure, regulated, and cooperative relational context that facilitates the internalization of standards and top-down control. Indeed, the effect of these programs on school readiness and CP was shown to be mediated by improved self-regulation (Bierman and Torres 2016; Raver et al. 2011).

Another parallel between classroom-based programs and *Hitkashrut* that supports the proposed dual mechanism of change is that both behavioral management and socioemotional

learning interventions improve socioemotional functioning and reduce CP (Bierman and Motamedi 2015; Bierman and Torres 2016; Nix et al. 2016). The socioemotional interventions have an explicit focus on coaching skills such as socioemotional information-processing, social problem-solving, emotion regulation, inhibitory control, and prosocial behavior. Furthermore, the transfer of socioemotional methods from classroom programs to PI has been shown to increase their effects on preschoolers' cognitive and socioemotional skills (Bierman et al. 2017). Generally, the stacking of interventions in order to target multiple contexts increases the impact on children's CP and is cost-effective when customized according to desired outcome (Foster et al. 2007). Thus, an encompassing family and preschool intervention is expected to increase the impact on children's self-regulation to a degree that may be manifested by simultaneous EC and IP mediated effects on later CP. The identification of subgroups of children with different etiologies and developmental needs can facilitate the provision of such customized interventions.

## Limitations

First, mediational analysis may suggest a mechanism of change but does not prove causality. It is a first step toward a more detailed and precise elucidation of the process by which change comes about. Second, the assessment was based on parental reports. Expectancy effects and shared method variance may have artificially inflated the associations among variables. Furthermore, while such reports reveal changes in parental perceptions of the child, the inclusion of other sources of information would have increased confidence in the findings. Third, although program adherence was regularly monitored in supervisory sessions, we did not use scales or observation-based data to assess fidelity. Fourth, the program was tested with an all-Jewish sample and outcome with other ethnic groups is uncertain.

We add a caveat in that the evidence for EC and CU mediation was found under optimal conditions that facilitated responsiveness and contributed to *Hitkashrut*'s impact: (a) *Hitkashrut* targeted preschoolers, a period during which child malleability and parental influence are relatively high; (b) the targeted moderate- to high-risk children were treated during an early stage in the progression of antisociality, when chances of a treatment response are greater compared to older children with diagnosed disorders who are referred for individualized tertiary prevention; (c) the sample was composed mostly of intact families and most parents were either employed or involved in religious studies; (d) the requirement of both parents' participation in a 14-session program enabled interventions that facilitated parental collaboration and increased father involvement, while excluding some of the more dysfunctional and less motivated families; and (e) the facilitators were educational psychologist with

preschool experience and group facilitation skills. These conditions probably contributed to *Hitkashrut's* impact, which was greater than average PI outcomes, and may be more difficult to achieve under less favorable conditions (Lundahl et al. 2006; Somech and Elizur 2012).

## Conclusion

Notwithstanding the reservations, this study that was conducted in real-world public service settings presents for the first time evidence that both EC and CU traits concurrently mediate PI's effect on CP when tested in one structural model. A post-hoc mediational analysis that controlled for the shared variance between the mediators and CP at T2 provided equivalent findings. Furthermore, a second model that simultaneously tested child- and parent-level mediators showed significant CU and IP mediated paths. This second finding, together with *Hitkashrut's* previous finding of a parenting mediated effect on CU traits (Elizur et al. 2017), strengthens the belief that the preschool years provide a golden opportunity for parents to influence early conscience development. A plausible implication of these findings for future PI design is to take advantage of this opportunity by incorporating interventions that promote moral development. Future research can test whether this strategy fulfills the expectation of achieving long-term internalized effect on the prevention of antisocial trajectories in high-CP children and if this effect is more pronounced in subgroups of children with high-CU and/or low-EC profiles.

Given the evidence provided by PI and classroom-based RCTs for the effectiveness of both the socioemotional and behavioral strategies (Duncombe et al. 2016; Bierman and Motamedi 2015), the current results also suggest that one intervention program can effectively integrate both strategies. Future research may test whether socioemotional functioning and behavior are improved by such an integration beyond the effect of a single-strategy program. Furthermore, in view of the more modest treatment effect on EC vs. CU traits, greater impact on self-regulation may be achieved by interventions that target multiple settings within a child's life (Foster et al. 2007). Overall, the current study strengthens confidence in the ability of a relatively brief and low cost intervention to produce internalized change that effects later CP. Nonetheless, some of the more vulnerable children will derive greater benefit from customized treatment that targets their unique psychological and neurobiological profiles. Children with early-onset CP who are characterized by high-level CU and low-level EC features are particularly at risk of severe antisocial trajectories (Frick 2012; Waller et al. 2013). Early intervention provides the highest potential to influence personality development and shape development in more desired directions. There is robust evidence that the earlier in life that these programs are provided, particularly to

disadvantaged children living in environments that do not cultivate their cognitive and socioemotional competencies, the higher the returns (Heckman 2006; Murray et al. 2015). The effects on long-term adult functioning include educational attainment, income, socioeconomic status, justice-system involvement, and substance abuse.

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## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** The Ministry of Education's Chief Scientist and the Hebrew University's Institutional Review Boards approved *Hitkashrut's* RCT. All procedures were in accordance with the ethical standards of these institutional and national research committees, and comparable with the 1964 Helsinki declaration and its later amendments.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

## References

- Abidin, R. R. (1990). *Parenting Stress Index manual*. Charlottesville: Pediatric Psychology Press.
- Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2015). The hidden efficacy of interventions: Gene x environment experiments from a differential susceptibility perspective. *Annual Review of Psychology*, 66, 381–409.
- Bandalos, D. L. (2002). The effects of item parceling on goodness-of-fit and parameter estimate bias in structural equation modeling. *Structural Equation Modeling*, 9, 78–102.
- Bierman, K. L., & Motamedi, M. (2015). SEL programs for preschool children. In J. A. Durlak, C. E. Domitrovich, R. P. Weissberg, & T. P. Gullotta (Eds.), *Handbook of social and emotional learning: Research and practice* (pp. 135–150). New York: Guilford.
- Bierman, K. L., & Torres, M. (2016). Promoting the development of executive functions through early education and prevention programs. In J. A. Griffin, P. McCordle, & L. S. Freund (Eds.), *Executive function in preschool-age children: Integrating measurement, neurodevelopment, and translational research* (pp. 299–326). Washington, DC: American Psychological Association.
- Bierman, K. L., Heinrichs, B. S., Welsh, J. A., Nix, R. L., & Gest, S. D. (2017). Enriching preschool classrooms and home visits with evidence-based programming: Sustained benefits for low-income children. *Journal of Child Psychology and Psychiatry*, 58, 129–137.
- Chang, H., Shaw, D. S., Dishion, T. J., Gardner, F., & Wilson, M. N. (2014). Direct and indirect effects of the family check-up on self-regulation from toddlerhood to early school-age. *Journal of Abnormal Child Psychology*, 42, 1117–1128.
- Chang, H., Shaw, D. S., Shelleby, E. C., Dishion, T. J., & Wilson, M. N. (2017). The long-term effectiveness of the family check-up on peer

- preference: Parent-child interaction and child effortful control as sequential mediators. *Journal of Abnormal Child Psychology*, (4), 705–717.
- Clerkin, S. M., Marks, D. J., Policaro, K. L., & Halperin, J. M. (2007). Psychometric properties of the Alabama parenting questionnaire-preschool revision. *Journal of Clinical Child and Adolescent Psychology*, 36, 19–28.
- Conduct Problems Prevention Research Group. (2011). The effects of the fast track preventive intervention on the development of conduct disorder across childhood. *Child Development*, 82, 331–345.
- Cross, S. P. M., Hermens, D. F., Scott, E. M., Ottavio, A., McGorry, P. D., & Hickie, I. B. (2014). A clinical staging model for early intervention youth mental health services. *Psychiatric Services*, 65, 939–943.
- Dadds, M. R., Fraser, J., Frost, A., & Hawes, D. J. (2005). Disentangling the underlying dimensions of psychopathy and conduct problems in childhood: A community study. *Journal of Consulting and Clinical Psychology*, 73, 400–410.
- Dadds, M. R., Cauchi, A. J., Wimalaweera, S., Hawes, D. J., & Brennan, J. (2012). Outcomes, moderators, and mediators of empathic-emotion recognition training for complex conduct problems in childhood. *Psychiatry Research*, 199, 201–207.
- Duncombe, M. E., Havighurst, S. S., Kehoe, C. E., Holland, K. A., Frankling, E. J., & Stargatt, R. (2016). Comparing an emotion- and a behavior-focused parenting program as part of a multisystemic intervention for child conduct problems. *Journal of Clinical Child and Adolescent Psychology*, 45, 320–334.
- Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*, 6, 495–525.
- Eisenberg, N., Spinrad, T. L., & Knafo-Noam, A. (2015). Prosocial development. In M. E. Lamb & R. M. Lerner (Eds.), *Handbook of child psychology and developmental science, Socioemotional processes, 7th ed* (Vol. 3, pp. 610–656). Hoboken: John Wiley & Sons.
- Elizur, Y. (2016). *Tommy Turtle's brainpower: Promoting children's social and emotional competence [Kindle edn.]*. Retrieved from [Amazon.com](http://Amazon.com).
- Elizur, Y., Somech, L. Y., & Vinokur, A. D. (2017). Effects of parent training on callous-unemotional traits, effortful control, and conduct problems: Mediation by parenting. *Journal of Abnormal Child Psychology*, 45, 15–26.
- Forehand, R., Lafko, N., Parent, J., & Burt, K. B. (2014). Is parenting the mediator of change in behavioral parent training for externalizing problems of youth? *Clinical Psychology Review*, 34, 608–619.
- Foster, E. M., Olchowski, A. E. P. D., & Webster-Stratton, C. (2007). Is stacking intervention components cost-effective? An analysis of the incredible years program. *Journal of the American Academy of Child & Adolescent Psychiatry*, 46, 1414–1424.
- Frick, P. J. (2004). The inventory of callous-unemotional traits. *Parent Report (Preschool Version)*. Retrieved from <http://labs.uno.edu/developmental-psychopathology/ICU.html>.
- Frick, P. J. (2012). Developmental pathways to conduct disorder: Implications for future directions in research, assessment, and treatment. *Journal of Clinical Child & Adolescent Psychology*, 41, 378–389.
- Frick, P. J., Ray, J. V., Thornton, L. C., & Kahn, R. E. (2014). Can callous-unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin*, 140, 1–57.
- Goffin, K. C., Boldt, L. J., Kim, S., & Kochanska, G. (2017). A unique path to callous-unemotional traits for children who are temperamentally fearless and unconcerned about transgressions: A longitudinal study of typically developing children from age 2 to 12. *Journal of Abnormal Child Psychology*. <https://doi.org/10.1007/s10802-017-0317-2>.
- Goodman, R., & Scott, S. (1999). Comparing the strengths and difficulties questionnaire and the child behavior checklist: Is small beautiful? *Journal of Abnormal Child Psychology*, 27, 17–24.
- Hawes, D. J., Dadds, M. R., Frost, A. D. J., & Hasking, P. A. (2011). Do childhood callous-unemotional traits drive change in parenting practices? *Journal of Clinical Child and Adolescent Psychology*, 40, 507–518.
- Hawes, D. J., Price, M. J., & Dadds, M. R. (2014). Callous-unemotional traits and the treatment of conduct problems in childhood and adolescence: A comprehensive review. *Clinical Child and Family Psychology Review*, 17, 248–267.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312(5782), 1900–1902.
- Johnson, A. M., Hawes, D. J., Eisenberg, N., Kohlhoff, J., & Dudeney, J. (2017). Emotion socialization and child conduct problems: A comprehensive review and meta-analysis. *Clinical Psychology Review*, 54, 65–80.
- Kaminski, J. W., & Claussen, A. H. (2017). Evidence base update for psychosocial treatments for disruptive behaviors in children. *Journal of Clinical Child & Adolescent Psychology*, 46, 477–499.
- Kazdin, A. E. (2007). Mediators and mechanisms of change in psychotherapy research. *Annual Review of Clinical Psychology*, 3, 1–27.
- Kimonis, E. R., Fanti, K. A., Anastassiou-Hadjicharalambous, X., Mertan, B., Goulter, N., & Katsimicha, E. (2016). Can callous-unemotional traits be reliably measured in preschoolers? *Journal of Abnormal Child Psychology*, 44, 625–638.
- Kline, R. B. (2015). *Principles and practice of structural equation modeling* (4th ed.). New York: Guilford.
- Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality*, 74, 1587–1617.
- Kochanska, G., & Kim, S. (2013). Difficult temperament moderates links between maternal responsiveness and children's compliance and behavior problems in low-income families. *Journal of Child Psychology and Psychiatry*, 54, 323–332.
- Kochanska, G., & Kim, S. (2014). A complex interplay among the parent-child relationship, effortful control, and internalized, rule-compatible conduct in young children: Evidence from two studies. *Developmental Psychology*, 50, 8–21.
- Kochanska, G., Barry, R. A., Jimenez, N. B., Hollatz, A. L., & Woodard, J. (2009). Guilt and effortful control: Two mechanisms that prevent disruptive developmental trajectories. *Journal of Personality and Social Psychology*, 97, 322–333.
- Kochanska, G., Kim, S., Boldt, L. J., & Yoon, J. E. (2013). Children's callous-unemotional traits moderate links between their positive relationships with parents at preschool age and externalizing behavior problems at early school age. *Journal of Child Psychology and Psychiatry*, 54, 1251–1260.
- Lundahl, B., Risser, H. J., & Lovejoy, M. C. (2006). A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review*, 26, 86–104.
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, 58, 593–614.
- McAdams, D. P., & Olson, B. D. (2010). Personality development: Continuity and change over the life course. *Annual Review of Psychology*, 61, 517–542.
- McGilloway, S., Mhaille, G. N., Bywater, T., Furlong, M., Leckey, Y., Kelly, P., et al. (2012). A parenting intervention for childhood behavioral problems: A randomized controlled trial in disadvantaged community-based settings. *Journal of Consulting and Clinical Psychology*, 80, 116–127.
- Michelson, D., Davenport, C., Dretzke, J., Barlow, J., & Day, C. (2013). Do evidence-based interventions work when tested in the “real world?” a systematic review and meta-analysis of parent management training for the treatment of child disruptive behavior. *Clinical Child and Family Psychology Review*, 16, 18–34.

- Murray, D. W., Rosanbalm, K., & Christopoulos, C. (2015). *Self-Regulation and Toxic Stress Report 4: Implications for Programs and Practice*. OPRE report # 2016-97. Washington, DC: Office of Planning, research and evaluation, Administration for Children and Families, U.S. Department of Health and Human Services.
- Nix, R. L., Bierman, K. L., Heinrichs, B. S., Gest, S. D., Welsh, J. A., & Domitrovich, C. E. (2016). The randomized controlled trial of head start REDI: Sustained effects on developmental trajectories of social-emotional functioning. *Journal of Consulting and Clinical Psychology, 84*, 310–322.
- Panter-Brick, C., Burgess, A., Eggerman, M., McAllister, F., Pruetz, K., & Leckman, J. F. (2014). Practitioner review: Engaging fathers – Recommendations for a game change in parenting interventions based on a systematic review of the global evidence. *Journal of Child Psychology and Psychiatry, 55*, 1187–1212.
- Patterson, G. R., Forgatch, M. S., & DeGarmo, D. S. (2010). Cascading effects following intervention. *Development and Psychopathology, 22*, 949–970.
- Raver, C. C., Jones, S. M., Li-Grining, C., Zhai, F., Bub, K., & Pressler, E. (2011). CRSP's impact on low-income preschoolers' preacademic skills: Self-regulation as a mediating mechanism. *Child Development, 82*, 362–378.
- Robinson, E. A., Eyberg, S. M., & Ross, A. W. (1980). The standardization of an inventory of child conduct problem behaviors. *Journal of Clinical Child Psychology, 9*, 22–29.
- Rothbart, M. K., Ahadi, S. A., Hersey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's behavior questionnaire. *Child Development, 72*, 1394–1408.
- Russell, D. W., Kahn, J. H., Spoth, R., & Altmaier, E. M. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology, 45*, 18–29.
- Shaw, D. S., & Shelleby, E. C. (2014). Early-starting conduct problems: Intersection of conduct problems and poverty. *Annual Review of Clinical Psychology, 10*, 503–528.
- Somech, L. Y., & Elizur, Y. (2012). Promoting self-regulation and cooperation in pre-kindergarten children with conduct problems: A randomized controlled trial. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*, 412–422.
- Thompson, R. A. (2014). Conscience development in early childhood. In M. Killen & J. G. Smetana (Eds.), *Handbook of moral development* (2nd ed., pp. 73–92). New York: Psychology Press.
- Tofghi, D., & MacKinnon, D. P. (2011). RMediation: An R package for mediation analysis confidence intervals. *Behavior Research Methods, 43*, 692–700.
- Ursache, A., Blair, C., & Raver, C. C. (2012). The promotion of self-regulation as a means of enhancing school readiness and early achievement in children at risk for school failure. *Child Development Perspectives, 6*, 122–128.
- Waller, R., Gardner, F., & Hyde, L. W. (2013). What are the associations between parenting, callous-unemotional traits, and antisocial behavior in youth? A systematic review of evidence. *Clinical Psychology Review, 33*, 593–608.
- Waller, R., Hyde, L. W., Grabell, A. S., Alves, M. L., & Olson, S. L. (2015). Differential associations of early callous-unemotional, oppositional, and ADHD behaviors: Multiple domains within early-starting conduct problems? *Journal of Child Psychology and Psychiatry, 56*, 657–666.
- Waller, R., Hyde, L. W., Baskin-Sommers, A. R., & Olson, S. L. (2017). Interactions between callous unemotional behaviors and executive function in early childhood predict later aggression and lower peer-liking in late-childhood. *Journal of Abnormal Child Psychology, 45*, 597–609.
- Weinblatt, U., & Omer, H. (2008). Nonviolent resistance: A treatment for parents of children with acute behavior problems. *Journal of Marital and Family Therapy, 34*(1), 75–92.
- Willoughby, M. T., Mills-Koonce, W. R., Waschbusch, D. A., & Gottfredson, N. C. (2015). An examination of the parent report version of the inventory of callous-unemotional traits in a community sample of first-grade children. *Assessment, 22*, 76–85.
- Yuan, K. H., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*, 165–200.