

Parental autonomy-supportive practices and toddlers' rule internalization: A prospective observational study

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Abstract Motivational research conducted within self-determination theory suggests that autonomy-supportive (AS) parenting fosters rule internalization, while more controlling tactics hinder it. The goal of the present study is to examine how AS in a socialization context relates to toddlers' internalization. Toddlers participated in a clean-up and a toy prohibition task at 2 and 3.5 years of age (T1: $N=102$; T2: $N=85$). Their parent's disciplinary strategies were coded the first year. Toddlers' committed compliance, indicative of rule internalization, was coded at both time points. After controlling for covariates and initial committed compliance, a linear regression was conducted to predict change in committed compliance over time. As expected, results reveal that parental AS strategies when toddlers were 2 years old were positively related to an improvement in committed compliance from 2 to 3.5 years of age, while controlling strategies predicted deterioration. This prospective, observational study suggests that supporting toddlers' autonomy in socialization contexts fosters rule internalization.

Keywords Autonomy-supportive parenting · Controlling parenting · Toddlers · Committed compliance · Internalization

Introduction

The parent–child relationship can be very fulfilling. Regardless, parental discipline can be challenging for both parent and child, perhaps particularly during toddlerhood (Nelson et al. 2014). In this period, children's assertion toward autonomy and agency occurs simultaneously as increasing demands are placed on them and as they are increasingly capable of initiating and regulating their conduct (Maccoby 1984). Thus, toddlers' socialization can be a strain on both parties. In a disciplinary context, parenting typically refers to bidding toddlers to perform a requested conduct or refrain from exhibiting a prohibited action (“do” and “don’t”, respectively; Kochanska and Aksan 1995).

A developmental perspective of toddlers' rule internalization

In the parent–child relationship, the child's (non)compliance begins following a parental demand, requesting the child to act in a specified way. The internalization process is the evolution from which these parental socialization attempts eventually become transformed into self-endorsed standards for child behavior which occur with distal parental monitoring (Forman 2007; Gralinski and Kopp 1993; Kochanska and Aksan 1995; Lepper 1983; Maccoby 1984). The self-control and self-regulation necessary in internalization however, is limited by the developmental age of the child. For instance, Kopp (1982) suggests that between the ages of 12 and 18 months, babies become capable of ‘control’, including the awareness of social demands and the ability to initiate, maintain and cease behavior, and to comply to caregiver's requests. Yet, Kopp (1982) indicate that only by the age of 24 months, toddlers acquire ‘self-control’, or the ability to delay on request and begin to

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regulate behavior, even in the absence of external monitors. By 36 months, self-regulation emerges, which Kopp (1982) defines as the flexibility of control processes that meet changing demands. As such, the shift from external regulation, where parents assist children's behavior regulation through guidance and structure provision, to autonomous self-regulation without parental monitoring emerges during toddlerhood (Kochanska et al. 2001). Of note, the word 'autonomous' self-regulation here refers to whether a child can self-regulate independently, without parental assistance or supervision. In early development research, toddler internalization of rules has traditionally been measured through types of compliance (Bandon and Volling 2008; Feldman and Klein 2003; Forman 2007; Kochanska and Aksan 1995; Kochanska et al. 1998, 2001; Kuczynski and Kochanska 1990). Committed compliance describes a child's full endorsement of parental agenda as its own; a type of compliance which takes place without parental cues or reminders. It has been found to be a good predictor of internalization of rules (e.g., Kochanska and Aksan 1995; Kochanska et al. 1998, 2001).

A self-determination theory perspective on rule internalization

Internalization of rules (i.e., to enact a socially desirable behavior or to suppress a forbidden one; e.g., to follow a request; not touching something enticing) is essential for children's social integration and psychosocial adjustment (Joussemet et al. 2005; Masten and Coatsworth 1998; Roth et al. 2009). On the one hand, parents would love their toddler to cooperate and follow their rules. Conversely, some research has shown that obtaining absolute obedience may negatively impact children's individuality, development and well-being (e.g., Dix et al. 2007). Deciding how to make a request or a prohibition may thus represent a challenge for parents, perhaps especially if they aim to foster both their toddler's cooperation and well-being.

Interestingly, a central tenet of self-determination theory (SDT; Deci and Ryan 1980, 1985, 2000, 2008b) is that all human beings have a natural propensity toward internalization, a key developmental process (along with intrinsic motivation). Internalization is the process by which children integrate less interesting but important behaviors and values of their social environment (Deci et al. 1994, 2013; Schafer 1968) and is often seen as the central goal of socialization, when children "take in" social regulations, make them their own, and eventually self-regulate autonomously (e.g., Lepper 1983; Schafer 1968). From the SDT perspective, autonomous self-regulation does not refer to independent self-regulation ("I can do it on my own without supervision"), as in developmental research. Indeed, people can act independently based on either autonomous

or more controlled, pressured forms of motivation (Soenens et al. 2007). For instance, cleaning-up in order to avoid punishment, shame, or to be perceived as competent are all controlled motivations, while cleaning-up because the child values helping, or wants to avoid breaking or losing some toys are more autonomous, volitional forms of motivation (Deci and Ryan 2008a; Soenens et al. 2007). Thus, SDT's autonomous self-regulation is based on volition, where one's actions, thoughts, and emotions are harmonious and integrated with one's hopes, desires, and values (Deci and Ryan 2008a, b). Importantly, SDT posits that this natural tendency towards autonomous self-regulation can be either facilitated or forestalled by one's social context through the un-/fulfillment of essential psychological needs (Deci and Ryan 2000; Deci et al. 2013; Ryan and Deci 2000a). Autonomy is one of the three essential psychological needs proposed by SDT, along with competence and relatedness (Deci and Ryan 1980, 1985, 2000, 2008b; Deci et al. 2013). As mentioned, the need for psychological autonomy does not translate into independence. Rather it transcribes into the sense of volition, choice, and personal endorsement of one's actions; to authentically reconcile the internal or external forces that influence behaviors (Deci and Ryan 2000, 2008a; Ryan and Deci 2000a). Autonomy is thus about harmonious, volitional and integrated functioning, in contrast to more pressured, conflicted or alienated experiences (e.g., defiance and submission) often related with psychological control.

There are four elements that are typically used to define autonomy support (see Deci and Ryan 2000, 2008b; Deci et al. 2013; Ryan and Deci 2000a for a theoretical review) in socialization relationships (e.g., teacher-student, parent-child). First, the provision of a personally meaningful *rationale* aids in understanding why the activity would have personal utility or relevance (Deci et al. 1994). For instance, to facilitate the internalization of a cleaning-up rule, a parent can explain to her child that someone could step on the toys and break them if left on the floor. The second element is *empathy*, or the acknowledgement of the individual's feelings about the request and his/her inclination (Koestner et al. 1984). Doing so conveys respect and legitimacy for children's desires and feelings (Deci et al. 1994). The next element relates to the provision of *choices* in the manner to tackle the task at hand, which encourages initiative (Deci et al. 1994). Finally, the fourth element concerns the *manner in which the request is made* to the child. The issue here is whether they are provided in a way that is either pressuring ("should", "musts", and "have to's") or in a respectful and agency-granting manner (Koestner et al. 1984; Ryan 1982). The chosen words in the request are key elements (Deci et al. 1993) in autonomy support.

Research conducted within the SDT framework has shown that autonomy-supportive (AS) parenting is

associated with positive child outcomes (see Joussemet et al. 2008; Moreau and Mageau 2013 for reviews) such as children's rule internalization, while controlling parenting is detrimental. There are several definitions of controlling parenting (see Grolnick and Pomerantz 2009 for a review). SDT research defines it mainly by disciplinary tactics characterized by pressure, domination, and intrusion (Grolnick and Pomerantz 2009; e.g., use of threats, orders, overprotection, guilt induction, bribes, love withdrawal). Controlling parenting thwarts children's sense of autonomy by pressuring them into feeling a necessity to control or change their thoughts, feelings, and behavior in order to meet parental expectations (Deci and Ryan 1980, 1985, 2000, 2008b; Grolnick and Pomerantz 2009). It is distinct from parenting characterized by guidance which, although frequently labeled as control, better represents behavioral structure (Grolnick and Pomerantz 2009).

Supporting toddlers' autonomy and rule internalization

Much of the research on AS and controlling parenting focalizes on school-aged children, adolescents and young adults. With regard to toddler populations, AS parenting is rarely measured. We found one study using self-report to assess AS parenting of toddlers (Zimmer-Gembeck et al. 2015). This four-item scale taps mothers' self-perception of their ability to (1) encourage their toddler to express their feelings; (2) support their toddler's efforts to try new things on his/her own; (3) support their toddler to be him/herself; and (4) allow their toddler to explore things by him/herself. Though an interesting first step, this self-report measure does not fully grasp all facets of the autonomy support construct and focuses on parents' beliefs about their abilities (vs. frequency of use), with an emphasis on toddlers' independence rather than autonomy (Ryan and Deci 2000b; Ryan et al. 2006). This is problematic as, for example, one could feel capable of encouraging a child to try new things and to explore things by him/herself while using controlling language, using bribes and sarcasm. Although it is good to invite a child to express their affect, once the child has done so, how does the parent respond? Does s/he empathize with the child or demands that s/he gets over it to move on? The AS construct is a simple, yet complex parenting practice. As such, we believe it is better measured in an observational context when studying toddlers.

Prior coding systems have not determined a set of behaviors that unquestionably untangle AS parenting from controlling parenting or warmth. For instance, gentle guidance (Kochanska 1995, 2000; Kochanska and Aksan 1995), a construct which includes behaviors akin to autonomy support (e.g., using reasoning, suggestions) also integrates potentially more controlling behaviors since direct commands are included in the gentle guidance code

if they were not accompanied by a negative comment, harsh physical intervention or threat (Blandon and Volling 2008; Kochanska and Aksan 1995; Volling et al. 2006). Thus, gentle guidance may represent a measure of lack of harshness, or at least a degree of gentleness with one's child. Indeed, a closer look at Kochanska and Aksan (1995)'s specific coding system (Kochanska 2000), which many developmental studies use (e.g., Blandon and Volling 2008; Kochanska 1995; Kochanska et al. 2001; Volling et al. 2006), reveals that much of the gentle guidance code relies on the tone of the parent. Yet, a parent could "speak softly" and "try to elicit the child's interest and challenge the child" (Kochanska 2000, pp. 8–9) while wording out sarcasm or bribing the child. Similarly, Kochanska's gentle guidance code relies on a "mothers' demeanor (as) playful, encouraging, affectively positive, and affectionate" in tone (Kochanska 2000, pp. 8–9) to elicit the child's compliance. When measures conflate autonomy support with warmth, affection, playfulness or happiness, it threatens conceptual clarity. In our view, the tone of voice and demeanor of the parent should not change the coded strategy. A threat or a bribe spoken in a soft or happy voice remains a threat or a bribe; these should be coded as such regardless of parental tone or demeanor.

Moreover, as this macroscopic (global) rating forces coders to choose one of its five codes on a 30-sec interval (0: no interaction; 1: social exchange, but no clean-up related control; 2: gentle guidance; 3: control; 4: power assertion), it does not permit the reality that parents can use both AS and controlling strategies within the same 30-sec interval. Yet, Skinner et al. (2005) have shown evidence that autonomy support and controlling parenting are two distinct, yet negatively related factors, thus clearly underlining the necessity that these constructs should both be measured, and separately. Codes that characterize a 30-sec interval to one specific code cannot differentiate parents who singularly use autonomy supportive or controlling strategies or a combination of both (and to what degree). Thus, Kochanska's gentle guidance code does not clearly detach the orthogonal constructs of autonomy support and controlling parenting.

Akin to orthogonality issues, prior coding systems have not clearly determined a set of behaviors that would be considered AS as distinct from *lower* controlling or sensitivity. Undoubtedly, controlling parenting enacted with toddlers is related to poorer physiological and emotional regulation, compliance, mastery motivation and competence development (e.g., Calkins et al. 1998; Feng et al. 2011; Frodi et al. 1985; Kochanska and Aksan 1995). Nevertheless, less controlling parenting does not equate more AS practices as they are distinct, orthogonal constructs (e.g., Silk et al. 2003; Vansteenkiste and Ryan 2013). Similarly, Whipple et al. (2011) have shown that parental sensitivity and

autonomy-support are only somewhat related ($r = .13$), thus underlying the discrete nature of these parenting practices. To this point, most of the observational research examining specifically autonomy support during toddlerhood was conducted in a play context. For instance, in Parpal and Maccoby (1985)'s study, parents were taught how to play in a way akin to autonomy support. A week later, when parents were asked to request compliance, which they solicited in a standardized way by repeating the experimenter's directions over radio, children of parents who had played in a "more autonomy-supportive" manner exhibited greater compliance.

Notably, some studies have examined the influence of observed parental autonomy support during toddlerhood, in a game activity (puzzle; Bernier et al. 2012; Matte-Gagné et al. 2013; Whipple et al. 2011; Zuk 2014), and found that parental autonomy support (when toddlers were 15-months) was positively related to children's executive functioning and security of attachment. The Bernier and colleagues coding system grasps some components of the autonomy support construct as defined by SDT, inspired by Grolnick's work (i.e., Grolnick et al. 2002; Grolnick and Ryan 1989). Their autonomy support variable is based on four subscales, which examine the extent to which the mother (1) intervenes according to the infant's needs and adapts the task to create an optimal challenge for the child; (2) encourages her child in the pursuit of the task, gives useful hints and suggestions, and uses a tone of voice that communicates to the child that she is there to help; (3) takes her child's perspective and demonstrates flexibility in her attempts to keep her child on task; (4) follows her child's pace, provides the child with the opportunity to make choices, and ensures that the child plays an active role in the completion of the task. While relying on observations is a strength, this coding system puts a strong emphasis on the task as an optimal challenge and can be conceived or interpreted as scaffolding (Hammond et al. 2012; Wood et al. 1976). In addition, this coding system relies on a single macroscopic (global) rating, forcing coders to choose one its four subscales. To our knowledge, observed AS parenting toward toddlers has never been coded using a microscopic rating whereby each discrete element used to define autonomy support was coded in segmented intervals. In addition, autonomy support toward toddlers has never been observed and coded within a socialization context, when parents need to motivate a toddler to perform an important yet unappealing task (e.g., clean-up request task).

The present study aims to examine how parental practices in a request context are related to toddlers' internalization by integrating research methods from developmental and motivational domains. Based on early development research, toddlers' rule internalization will be assessed in socialization contexts ("do" and "don'ts") by coding their committed

compliance (wholehearted endorsement of maternal agenda; Kochanska and Aksan 1995). Based on motivational research anchored in SDT, we will measure the extent to which parents support and thwart toddlers' need for autonomy in a specific way.

Global constructs of mutual responsiveness and gentle control have been studied and shown to be positively related to rule internalization (e.g., Kim and Kochanska 2012; Kochanska 1997; Kochanska et al. 2001). The goal of the present study is to focus on the autonomy granting versus thwarting dimensions within parental discipline behaviors, avoiding the potentially confounding impact of child-parent reciprocity. The motivation SDT model helps clarify which practices are specifically related to autonomy (e.g., evaluative vs. informational feedback; Martens et al. 2010; Rakoczy et al. 2008). As such, we also aim to avoid the potentially confounding impact of the related yet distinct dimensions of warmth (vs. rejection) and structure (vs. chaos; Skinner et al. 2005). Finally but importantly, relatively little research on AS and controlling parenting practices have been conducted with toddlers and solely studied in "game-like" contexts. As such, the present study focuses on a request context and examines the predictive power of AS and controlling strategies on the development of toddlers' rule internalization. Of course, considerations for child and family confounds that either "pull" for more parental control (e.g., difficult temperament, financial strain; Grolnick 2002) or ease child self-regulation (e.g., easy temperament; Rothbart 2011) will be included as potentially confounding variables.

Present study

Using observational data, the present study examined toddler's committed compliance at 2 and 3.5 years old, in "do" and "don't" discipline contexts. Diverse parenting practices thought to reflect controlling and AS parenting were coded during a clean-up context ("do") when toddlers were 2 years of age. After controlling for toddlers' committed compliance at age 2 (T1) as well as for important determinants of rule internalization (i.e., temperamental and socio-demographic characteristics), we examined how parenting predicts changes in committed compliance over time. It was expected that AS parenting would predict improvements in committed compliance at 3.5 years old (T2) while controlling parenting practices would impede it.

Method

Participants

Data collection occurred over a 2-year period. Emulating similar observational studies (e.g., Kochanska and Aksan

1995), 109 2-year-old toddlers ($M=26.43$, $SD=1.74$ months, 56% boys) and their primary caregiver (mothers in 92.7% of cases) participated in the first data collection year (T1). The dyads were recruited by using various methods including birth lists, letters to daycares, as well as poster and newspaper ads in the Montreal (Quebec, Canada) area. All primary caregivers spoke either English (64.2%) or French in their homes, and most had a university education (61.4%). The participating families lived in various economic conditions, as family income varied from $<\$25,000$ (11.9%) to more than $\$100,000$ (14.7%). The largest proportion of participating families lived with an annual income between $\$50,000$ and $\$75,000$ (25.7%), followed by an income ranging between $\$75,000$ – $\$100,000$ (22%), and $\$25,000$ – $\$50,000$ (19.3%). All participants were compensated for their time, whereby parents received $\$20$ and the child received a small toy after each visit.

During the first data collection year, all but three dyads attended two videotaped lab visits, approximately 1–2 weeks apart ($M=10.68$ days, $SD=6.61$). Recording problems obstructed all coding of four participants' lab visit videos. Thus, a total of 102 parent–child dyads had complete data available at Time 1 (T1).

Eighty-three percent of the original sample (86 dyads; 95.3% mothers) participated in the second data collection year, when children were 3.5 years of age ($M=41$ months, $SD=1.88$ months, 39% boys). Since one dyad did not come back for the second laboratory visit, the final sample at T2 was 85 dyads who attended the two videotaped lab visits (M days between visits = 9.43, $SD=5.0$).

For each data collection year, informed consent was obtained from all parent participants included in the study. To address attrition, a multiple imputation was calculated for those who participated in the second data collection year ($n=85$).

Procedure

When participating toddlers were 2- and 3.5-year-old (T1 and T2), the parent–child dyads were videotaped during two visits taking place 1–2 weeks apart. Each visit lasted 65–85 min. The dyads participated in a series of activities meant to elicit everyday activities, such as play time, snack time, storytelling, imitation and other learning activities. The testing rooms, a playroom and a naturalistic living room, were each rigged with two cameras. The former was equipped with a table and two chairs, while the latter had a couch, an armchair, a coffee table with a few toys and an off-limit shelf filled with attractive toys. The present study focuses on the clean-up tasks and any activity taking place in the living room, during which children were prohibited from touching the attractive toys.

At each visit, parents were invited to reinforce rules in contexts where they asked their child (a) to do an unpleasant activity (i.e., clean-up toys) and (b) to refrain from engaging in an appealing attractive activity (i.e., not touching attractive toys). These experimental tasks represent prototypes of Kochanska and colleagues' "do" and "don't" socialization contexts (e.g., Kochanska and Aksan 1995) and results set in our lab setting have been published (e.g., Gosselin and Forman 2012).

"Do" context

This experimental task represents prototypes of Kochanska and colleagues' "do" socialization contexts (e.g., Gosselin and Forman 2012; Kochanska and Aksan 1995). The "do" context consisted of a clean-up task in the playroom during each lab visit, with 7 min to complete. After 5 min of free play, the instructor requested the parent to ask their toddler to clean up the toys and try to make the task more the child's responsibility than theirs. Toddlers thus spent a total time of 14 min in this "do" context, at each time point (at T1 and at T2).

"Don't" context

There were numerous "don't" situations, all taking place in the living room, equipped with a shelf with a large number of attractive toys. Children were expected to never touch them. The few other toys available in the living room were either uninteresting for toddlers or required adult assistance to play with (i.e., a view-master with slides, two books, and a puzzle). Parents were given the following instruction when they first entered the living room and were told to reinforce the attractive toys prohibition rule whenever the dyad was in this room: "The room we are about to enter has a shelf with toys on it. Please point them out as off-limits to your child as soon as we enter the room, even if this is not something you would typically do when you do not want your child to touch something." On every occasion the dyad was placed in the living room setting, the "attractive toys prohibition" task was coded. The total time spent in this "don't" context was 62 min at T1 (27 and 35 min during the first and second visit, respectively) and at T2 (35 and 27 min, respectively).

Behavioral coding measures

Teams of graduate and undergraduate students independently observed and coded the video recordings of each visit. All parenting dimensions in the present study were coded by different coding teams.

Parental practices (“do” context)

A coding system was developed to assess the parenting dimensions of controlling parenting (derived from Hastings 1996; Joussemet et al. 2014; Rubin and McKinnon 1994; Soenens and Vansteenkiste 2010) and autonomy support (derived from Frodi et al. 1985; Grolnick and Ryan 1989; Joussemet et al. 2014) when the toddlers were 2 years old. This continuous coding served to assess parental disciplinary practices during the T1 “do” clean-up tasks (14 min in total; 7 min per visit), whereby each behavioral code was marked as being present or absent in each 30-second segment.

Controlling parenting This coding system consisted of computing the sum of four parental practices, derived from two coding schemes (Hastings 1996; Rubin and McKinnon 1994) and from theoretical operationalization of this construct (Barber et al. 2012; Deci and Ryan 2008b; Joussemet et al. 2014; Vostanis et al. 1994). The *Physical Force* code [two-way random effects intra-class correlation (ICC)=0.90; Shrout and Fleiss 1979] was coded each time the parent held the child’s hand/arm or held the child down as a way to make him/her clean-up. *Threaten/Punish* (ICC=0.98) was coded whenever the parent suggested a negative outcome if the child didn’t pick up toys (e.g., “Do you need a time-out”, “If you don’t do this now you can’t play later”, “OK, no treat for you”). The *Criticism* code (ICC=0.94) reflected parents using insults, criticism, sarcasm regarding the child or his/her cleaning behaviors. In addition, based on SDT, which identifies expected rewards as controlling, a *Bribing* code (ICC=0.96) was given whenever a parent tried to convince his/her child to pick up the toys by promising a positive outcome after the clean-up.

Autonomy support This exploratory coding system consisted of the sum of five parental practices thought to represent support for a toddler’s autonomy in a “do” discipline context. The first three were based on the classical definition of autonomy support (Koestner et al. 1984). Offering a rationale, choice, and using non-controlling language are typical elements used to operationalize autonomy support.¹ In the present study, *Rationale* (ICC=0.85) was coded when the parent gave meaningful reasons for cleaning up (e.g., “it’s important to clean up to make it all nice in here, to have more space”). In the *Choice Provision* code (ICC=0.78), the parent encouraged the child to make choices or bring his/her input in the manner in

which the task is achieved. *Suggestion* (ICC=0.85) was coded as a form of non-controlling language, when parents ask gently (e.g., “Can you put this away? Let’s clean-up”), rather than giving orders (e.g., “Put this block in the bin”).

The following two practices were coded to explore other ways parents may attempt to support a toddler’s autonomy. The *Describe* code (ICC=0.83) was scored whenever the parent pointed to a perceived problem, gave information as to this issue without suggesting any actions, in an impersonal manner (e.g., “There are blocks left in the corner”). Describing the situation is seen as a non-controlling way to provide information (Faber and Mazlish 1980, 2010; Ginott 1969; Joussemet et al. 2014; Ryan 1982). Similarly, singing a clean-up song was thought to be an informational, impersonal (Ryan 1982) and age-appropriate way of making the clean-up request and/or repeat that request, a putative manifestation of autonomy support toward toddlers. *Sing* code (ICC=1.00) was given each time the parent sang a “clean-up song”.

Committed compliance

The present categorical coding system was adopted from Kochanska and Aksan (1995), in which five child behaviors were coded (Kochanska 2000). The same compliance codes were used at T1 and T2. During all “do” and “don’t” periods (respectively 14 and 62 min each year), one of the five compliance codes was given in each 30-s segment (Cohen’s Kappa=0.86 and 0.78 at T1 and T2, respectively). *Committed Compliance* codes depict the child’s full endorsement of maternal agenda, embracing the task wholeheartedly. The maternal agenda functions as the child’s own; the child spontaneously conforms to parental demand without parental intervention. Specifically, the child stays on task with very few or no maternal directives; s/he complies to the general directive through most of the segment. The child does not appear to need immediate maternal interventions/prompts to maintain task orientation; s/he has clearly accepted the task as his/her own and is actively involved (Kochanska 2000). Although situational compliance, passive noncompliance, overt resistance and defiance were coded, they were not used in the present study as they are not specifically

¹ Though empathy is commonly used when defining autonomy support, this element was not coded, as it is a way, for mothers, to

Footnote 1 (continued)

react to manifestations of children’s distress and never used as a way to introduce the clean-up task or to solicit cooperation. Instead, the acknowledgment of a child’s feelings seemed to be used reactively rather than proactively, to diffuse/calm emotional outburst.

related to rule internalization (e.g., Kochanska and Aksan 1995; Kochanska et al. 2001).

Parent reports

The primary caregiver also filled-out questionnaire measures during the lab visits. While the socio-demographic measure was completed when participating children were both 2 and 3.5 years old, the child temperament measure was collected when they were 2 years old.

Socio-demographic information

Some socio-demographic information was collected when children were 2 years old. The child's age (months at visit 1, T1) and sex, the parent's gender, ethnic background, marital status, education level, as well as the family's income information were used in the present study. Additional information was collected when children were 3.5 years old and allowed to assess changes in marital status and whether there were siblings at home.

Child temperament

The Early Child Behavior Questionnaire (ECBQ; Putnam et al. 2006) was used as a measure of children's temperament, when they were 2 years old. This is a 201 item scale, where parents rate the frequency of specific child behaviors over the previous 2 weeks, from 0 (*never*) to 7 (*always*). The ECBQ yields three factors in reactivity and self-regulation: Negative affectivity, effortful control and surgency/extraversion (Putnam et al. 2006). Negative affectivity represents reactivity and proneness to distress (e.g., anger, sadness, fear). Effortful control delineates self-regulation tendencies, which serve to act upon one's reactive tendencies (Rothbart 2011). Operating through attention, effortful control can decrease or increase temperamental reactivity (onset, intensity or duration), and thus reflects the child's temperamental ability to suppress a dominant response in order to perform a subdominant response (Rothbart 2011). Finally, surgency is similar to adults' personality factor of extraversion (Rothbart 2011). It includes approach behaviors, impulsivity, high-intensity pleasure (sensation seeking) and high activity level. The ECBQ has shown good internal coherence, test-retest reliability and validity (Goldsmith 1996; Kochanska and Knaack 2003; Lemery et al. 1999; Putnam et al. 2006). Descriptive statistics can be found in Table 1.

Results

Data preparation

For each observational code, a total proportion score was calculated. For each visit, the behavioral codes were summed and then divided by the total number of interval segments in the visit. This yields a behavioral code average for each visit, each year. Since all codes were consistent across the two laboratory visits (i.e., their *SDs* fell in a similar range at both visits, each year), proportion scores were calculated by averaging each code across the two visits, on each year. There was a committed compliance score in each context ("do" and "don't") of each collection year (T1 and T2; four variables), while there were nine parental codes (i.e., physical force, threaten/punish, criticism, bribing, rationale, choice, suggestions, describe, clean-up song) at T1.

Normal distribution analyses were conducted. Out of these 13 proportion scores, six were transformed using either log or squared root analyses to ascertain a normal distribution (± 3.00 skewness and kurtosis; Kline 1998). Extreme score analyses (univariate and multivariate) were also conducted. Univariate extreme scores were found in nine proportion scores, for which all data beyond their respective limit score were replaced with their limit score (Tabachnick and Fidell 2001). There were no participants who had multivariate extreme scores beyond the accepted limit, $\chi^2_{\text{critical}}(16) = 39.25$, $p < .001$ (Tabachnick and Fidell 2001).

Finally, the parenting variables of AS and controlling parenting were created by summing their respective behavior codes. Confirmatory factor analyses (CFA) using structural equation modeling (SEM) in Amos 24.0 were conducted on both parenting variables and showed a good fit for both, autonomy support: $\chi^2 \text{ index}(5) = 1.05$, $p = .96$, CFI = 1.00, TLI = 3.03, RMSEA < 0.001 and controlling parenting: $\chi^2 \text{ index}(2) = 1.19$, $p = .55$, CFI = 1.00, TLI = 1.15, RMSEA < 0.001. The committed compliance scores were calculated by averaging the committed compliance scores across both contexts ("do" and "don't") each year, thus creating one committed compliance score per collection year. Moreover, all continuous variable (predictors, confounds, outcomes) were standardized.

Data imputation

After comparing our complete and incomplete data on key demographic variables, our data was found to be missing at completely random, Little's MCAR test: $\chi^2(43) = 43.85$, $p = .44$ (Little and Rubin 1989). To address attrition, a multiple imputation by chained equations (SPSS) imputed missing values on covariates for T2 participants ($n = 85$).

Table 1 Descriptive statistics

	N	Mean	Std. deviation	Minimum	Maximum
Committed compliance—T1	85	0.52	0.17	0.08	0.97
Committed compliance—T2	85	0.57	0.19	0.07	0.97
Ethnic background	83				
1. First nations	0	0.00%			
2. Caucasian	64	75.29%			
3. Asian	4	4.71%			
4. Black	3	3.53%			
5. Mixed-other	11	12.94%			
6. Ethnicity disclosure refusal	1	1.18%			
Current employment	85				
1. Homemaker	27	31.76%			
2. Working part-time	24	28.24%			
3. Working full-time	25	29.41%			
4. Retired	0	0.00%			
5. Other	4	4.71%			
6. Maternity leave	5	5.88%			
Change in marital status in the last 18 months (T1 to T2)	85				
1. Yes	6	7.06%			
2. No	79	92.94%			
Parent's education	83				
1. Not finished high school	1	1.18%			
2. High school/G.E.D.	12	14.12%			
3. College/technical training	19	22.35%			
4. Undergraduate university degree	32	37.65%			
5. Graduate university degree	18	21.18%			
Family income	82	3.18	1.22	1.00	5.00
Effortful control	77	4.68	0.57	3.17	5.88
Autonomy support	85	0.50	0.25	0.00	1.01
Controlling parenting	85	0.15	0.15	0.00	0.64

Fewer than 10% of observations were imputed. We created 100 datasets, and conducted regression analyses that pooled results from them.

Preliminary analyses

Temperament and socio-demographic covariates

Next, we evaluated the association between all our variables. Table 2 illustrates zero-order correlations between all of the study's main variables.

To predict committed compliance change between T1 and T2 (2 and 3.5 years old), T1 committed compliance was included as a covariate in the principal regression model. Statistically, the remainder variance in T2 committed compliance thus relates to any changes in this variable between T1 and T2. As more temperamentally sensitive, impulsive and thrill seeking children elicits more parental control (i.e., negative affectivity, surgency/extraversion;

Grolnick 2002; Rothbart 2011) and children's temperamental ability to suppress a dominant response to perform a subdominant response (i.e., effortful control; Rothbart 2011) aid in self-regulation, these temperamental characteristics were also included as covariates in our model. Finally, socio-demographic variables previously found to facilitate or strain parent-child interaction were also added (parental education and employment, total family income, ethnic background, change in marital status between 2 and 3.5 years old).

Main analyses

We examined how parental practices during a clean-up task (T1) predict changes in children's committed compliance. A linear regression was conducted predicting 3.5-year-old's committed compliance (T2) as a dependent variable (see Table 3), and included 2-year-old's committed compliance and all four covariates.

Table 2 Bivariate associations among study variables

	1	2	3	4	5	6	7	8	9	10	11
1 Committed compliance—T1											
2 Committed—T2	0.47	<0.001									
3 Ethnic background	-0.04	0.70	-0.24	0.03							
4 Current employment	0.21	0.05	0.06	0.56	0.16	0.15					
5 Family income	0.24	0.03	0.18	0.11	-0.09	0.45	0.08	0.46			
6 Marital status change	-0.15	0.17	-0.09	0.43	0.05	0.67	-0.13	0.23	0.20	0.08	
7 Parent's education	0.07	0.55	0.13	0.23	-0.04	0.69	-0.01	0.93	0.40	<0.001	0.09
8 Extraversion/surgency	-0.19	0.09	-0.23	0.04	0.13	0.26	-0.15	0.20	0.04	0.75	0.04
9 Negative affectivity	0.05	0.69	-0.02	0.83	0.18	0.11	-0.20	0.09	0.03	0.82	0.34
10 Effortful control	0.32	0.005	0.15	0.19	-0.02	0.84	0.25	0.03	-0.10	0.39	0.06
11 Autonomy support	0.04	0.70	0.26	0.02	-0.12	0.29	-0.32	0.003	0.04	0.69	0.72
12 Controlling parenting	-0.42	<0.001	-0.31	0.004	-0.09	0.40	-0.11	0.32	-0.15	0.17	0.00

All continuous variables (outcome and predictors) were entered as Z scores

Table 3 Results from a linear regression predicting committed compliance change over time

	Committed compliance (3.5 years old)	
	β	p
Covariates		
Committed compliance (2 years old)	0.32	0.005
Ethnic background	-0.16	0.02
Current employment	0.05	0.48
Family income	-0.01	0.96
Marital status change	-0.25	0.52
Parent's education	0.08	0.44
Surgency/extraversion	-0.08	0.45
Negative affectivity	0.01	0.93
Effortful control	-0.01	0.92
Predictors		
Autonomy support	0.27	0.008
Controlling parenting	-0.22	0.05
R^2	0.39	<0.001

All continuous variables (outcome and predictors) were entered as Z scores; β represents standardized coefficient and effect sizes (calculated when Z score outcomes are in model); covariates: T1 (2 years old) committed compliance, ethnic background, parent education, surgency/extraversion, negative affectivity and effortful control; T2 (3.5 years old) current employment, family income, marital status change (between T2 and T1); Predictors (2 years old): autonomy support (REASON, choice, suggest, describe, song) and controlling parenting (physical force, threat/punish, criticism, bribe)

The model predicting T2 committed compliance was significant, $R^2=0.39$, $F(11,73)=4.28$, $p<.001$, and explained 39% of the variance in changes in committed compliance over 1.5 years. As hypothesized, AS parenting predicted improvements in rule internalization, *Stand.* $\beta=0.27$, $p=.008$, over time. Thus, AS parenting holds moderate sized effects on rule internalization improvements over time.² There was also a reverse significant effect for controlling parenting, which predicted a small deterioration in child self-regulation over time, *Stand.* $\beta=-0.22$, $p=.05$.

A follow-up analysis was generated to improve understanding of the significant categorical ethnicity variable effect (see Table 4). Because our sample did not have any representations of the first nations category, it could not be entered as a category in our model. A binary variable for Asian, African-American, mixed/other ethnicity and ethnicity disclosure refusal categories were included in the model. The binary Caucasian category was omitted

² With standardized coefficients, values of 0.10, 0.30 and 0.50 represent small, medium and large effect sizes (Cohen 1988).

Table 4 Results from a linear regression predicting committed compliance change over time

	Committed compliance (3.5 years old)	
	β	p
Covariates		
Committed compliance (2 years old)	0.32	0.008
Asian ethnicity	−0.54	0.26
African-American ethnicity	−0.25	0.67
Mixed/other ethnicity	−0.61	0.04
Ethnicity disclosure refusal	−0.55	0.59
Current employment	0.04	0.60
Family income	−0.01	0.91
Marital status change	−0.21	0.61
Parent's education	0.08	0.48
Surgency/extraversion	−0.08	0.45
Negative affectivity	−0.01	0.90
Effortful control	−0.02	0.88
Predictors		
Autonomy support	0.28	0.01
Controlling parenting	−0.22	0.05
R^2	0.41	<0.001

All continuous variables (outcome and predictors) were entered as Z scores; β represents standardized coefficient and effect sizes (calculated when Z score outcomes are in model); covariates: T1 (2 years old) committed compliance, each ethnic background binary category (with Caucasian ethnicity set as comparison category), parent education, surgency/extraversion, negative affectivity and effortful control; T2 (3.5 years old) current employment, family income, marital status change (between T2 and T1); predictors (2 years old): autonomy support (reason, choice, suggest, describe, song) and controlling parenting (physical force, threat/punish, criticism, bribe)

from the model in order to render it our comparison group for ethnicity categories entered in our model. The same previous findings were found in this model, $R^2=0.41$, $F(14,70)=3.44$, $p<.001$, and autonomy support, $Stand \beta = 0.28$, $p=.01$, and controlling parenting, $Stand \beta = -0.22$, $p=.05$, predictor variables. With regards to ethnicity, results reveal that having a mixed/other ethnicity category predicted a large diminution in committed compliance over time, $Stand \beta = -0.61$, $p=.04$. No other ethnicity category had significant results.

Discussion

In the present study, we hoped to better understand which disciplinary practice would prove useful for promoting children's rule internalization to parental requests and prohibitions ("dos" and "don'ts") as they are essential for children's social integration and psychosocial adjustment. As expected, AS parenting predicted increases in rule

internalization (i.e., committed compliance; Kochanska et al. 2001), as measured across socialization contexts, over a period of 1.5 years. The more parents were observed as AS when their toddlers were 2 years old, the more their toddlers had improved in wholehearted compliance to parental requests at 3.5 years of age. Thus, when requesting an important yet mundane and frustrating task to toddlers, using a combination of (1) explanations for the "why" it is important to do the task, (2) providing some choices in the manner in which it can be done, (3) using non-controlling language, (4) providing simple, non-personal descriptions of the problems (e.g., there are blocks in the corner), and using an impersonal and structuring song about the task (clean-up song) seem to foster gains in toddlers' rule internalization. Also as expected, controlling parenting practices (i.e., physically forcing the child to comply, using threats and punishments, criticism and/or sarcasm, and bribes) was associated with small reductions in committed compliance over time. The more parents were observed as controlling when their toddlers were 2 years old, the less their toddlers complied wholeheartedly to their parent's requests and prohibitions at 3.5 years old.

The link found between AS parenting and child rule internalization are similar to those found with school-aged children. With older children, autonomy support is associated with higher quality internalization and greater integration of important but uninteresting activities (e.g., Joussemet et al. 2004). AS parenting has also been shown to be associated with higher teacher-rated child competence, better standardized achievement scores and grades, as well as better child psychosocial adjustment and children perceiving themselves as more competent (e.g., Grolnick and Ryan 1989). AS parenting has also been found to predict better social and academic adjustment, reading achievement, and interest-focused academic engagement (Joussemet et al. 2005; Roth et al. 2009). With regards to early childhood, Frodi et al. (1985) reported that more supportive tactics with infants foster mastery motivation and competence development between the ages of 12 and 20 months of age. Similarly, maternal autonomy support during late infancy has recently been studied in game-like tasks. It was found to be a predictor of toddlers' security of attachment (Whipple et al. 2011) and later executive functioning (Bernier et al. 2010).

Interestingly, in our study, the association between AS parenting and improvement in committed compliance were present above and beyond toddlers' effortful control, amongst other covariates. This indicates that, regardless of toddlers' initial ability to self-regulate, AS parenting improves committed compliance over time. Kim et al. (2013) found that 3- and 4-year-old children's self-regulation in emotionally frustrating tasks (i.e., behavioral effortful control in delay of gratification

tasks) singularly predicted child behavior problems, while regulation in an emotionally neutral context (e.g., a motor inhibition tasks) were unrelated to this outcome. The authors attributed this differential impact to the context in which self-regulation was taking place (i.e., “hot”, emotionally charged vs. “cold”, neutral setting). The present study suggests that supporting toddlers’ autonomy in a challenging, “hot” socialization context fosters improvements in committed compliance, a form of behavioral self-regulation (Kochanska et al. 2001) and may protect children from later behavioral problems. Future studies would be needed to directly study this putative link.

The detrimental effects of controlling practices were similar to those found in previous toddler studies. For instance, Kochanska and Aksan (1995) have found that negative control (“do” and “don’t”) was negatively related to committed compliance. Assessing controlling parenting precisely rather than using a broader “negative” parenting variables deepens our understanding about this specific parenting behavior (controlling parenting; Grolnick and Pomerantz 2009), which has been previously shown to impede on autonomous motivations, competence development and hinder regulation (e.g., Frodi et al. 1985; Ryan and Deci 2000a).

Based on motivational research (SDT; Deci and Ryan 1980, 1985, 2000, 2008b), we assessed parental practices specifically tied to the autonomy granting versus thwarting dimension. We excluded behaviors falling on the warmth-hostility dimension to avoid conflating these distinct construct and confounding interpretation. Moreover, since these parenting constructs were measured in a specific parenting context (requests only), the results suggest that adopting an AS approach, even when making potentially frustrating requests to toddlers (such as cleaning up toys), contributes to facilitating their general rule internalization capacity.

Finally, our data suggested that being from mixed/other ethnicity category is associated with a large deterioration in committed compliance change between T1 and T2. This was unexpected, and unfortunately the label ‘mixed/other’ makes it very difficult to identify the specific ethnicity or metis combination which drives this association. It is clear however that, when compared to Caucasian families, being from Asian or African-American descent does not transcribe into changes in committed compliance. All other confounds in our model did not hold any predictive power on developmental self-regulation changes above and beyond autonomy supportive and controlling parenting practices.

Strength and limitations

Some characteristics of this study should be taken into account when interpreting its findings. First, as with all longitudinal studies, there is a possibility that selection effects partly explain the findings, as families who participate in intensive longitudinal observational research may be different than those who do not. Other limitations relate to the possibility that factors other than the parenting practices studied explain the differences in children committed compliance over time such as children’s security of attachment and language development which were not examined. Likewise, while the ethnic category label “mixed/other” is predictive in large deterioration in committed compliance change as compared to those of Caucasian descent, it is impossible to specifically pinpoint which metis combination or ‘other’ ethnicity that drives this association. Also, it is possible that other, untested confounds specific to the environment of the dyads from this ethnic subcategory is explaining this association. To address these limitations, we controlled for a careful selection of confounders. The quality of observational data, the strong methodological construction of the study where parent–child dyads were invited to two visits on each data collection year, and the validity of observational coding reassure us that our findings are valid. Still, the correlational design prevents causal inferences. Beyond the scope of these limitations, the research design of this study is robust, as it is set in a longitudinal framework using primarily observational measures and the findings are generalizable to both socialization contexts [i.e., parental requests (“dos”) and prohibitions (“don’ts”)] with toddlers.

Future studies

The present study points to several future research directions. For instance, it would be interesting to develop ways to code AS and controlling practices in “don’t” settings, such as delay of gratification tasks, which would further insight on the role of the need for autonomy on the internalization process. Distinguishing externally controlling (e.g., screaming) from internally controlling parenting (e.g., love withdrawal; see Soenens and Vansteenkiste 2010) in both discipline contexts (“do”, “don’t”) would probably be informative. Observing toddlers’ compliance when interacting with other socialization agents, such as daycare educators, is also another interesting research avenue. It would then be possible to verify if effects are agent-specific or generalizable. Also, assessing AS parenting in Kochanska’s later internalization task, where no parent is monitoring the 4.5 year-old’s conduct, could further corroborate our findings. Similarly, by following toddler participants until they become school-aged children, it would be possible to

assess children's level of self-determination, by using self-reports. A wealth of research measuring the reasons why individuals follow rules has identified optimal motivational styles, and their antecedents and consequences (e.g., Deci and Ryan 2008a). Also, SDT posits that optimal functioning and well-being occurs when all three psychological needs are met (e.g., Deci et al. 1993, 2013; Deci and Ryan 2008b). Future studies could assess all three needs in toddler population and examine their interplay to further our understanding about toddlers' internalization processes.

As fulfilling the parent-child relationship may be, this bond comes with numerous challenges, perhaps especially when encountering disciplinary contexts. Better understanding (mal)adaptive disciplinary practices and their relationship to longitudinal improvements in rule internalization and behavioral self-regulation is crucial. In contrast to controlling forms of discipline, which reduces rule internalization, AS practices seem to be part of a beneficial alternative disciplinary approach. As parenting is a malleable determinant of child adjustment, empirical efforts should be pursued and interventions should be provided to help parents support rather than thwart their toddler's need for autonomy. Prevention programs offered to parents of the general population, early in children's lives, hold potential to take the lead toward promoting children's self-control and well-being.

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Compliance with ethical standards

Conflict of interest All authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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

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