

The Development of Self-Regulation in the First Four Years of Life

Grazyna Kochanska, Katherine C. Coy, and Kathleen T. Murray

This study examined longitudinally the development of self-regulation in 108 young children during the first 4 years of life. Children's committed compliance (when they eagerly embraced maternal agenda) and situational compliance (when they cooperated, but without a sincere commitment) were studied. Both forms of compliance were observed in "Do" contexts, in which the mothers requested that the children sustain unpleasant, tedious behavior, and in "Don't" contexts, in which they requested that the children suppress pleasant, attractive behavior. Children's internalization while alone in the similar contexts was also studied. Parallel assessments were conducted when the children were 14, 22, 33, and 45 months of age. At all ages, the Do context was much more challenging for children than the Don't context. Girls surpassed boys in committed compliance. Both forms of compliance were longitudinally stable, but only within a given context. Children's fearfulness and effortful control, observed and mother reported, correlated positively with committed compliance, but mostly in the Don't context. Committed, but not situational, compliance was linked to children's internalization of maternal rules, observed when the children were alone in the Do and Don't contexts. These links were both concurrent and longitudinal, context specific, and significant even after controlling for maternal power assertion. There was modest preliminary evidence that committed compliance may generalize to interactions with adults other than the mother.

INTRODUCTION

The ability to act in accord with social standards and to regulate one's behavior is among the hallmarks of development and socialization during the early years. How young children begin to adopt parental rules, and how regulation of conduct shifts from external to internal, are among the fundamental questions of socialization (Bugental & Goodnow, 1998; Lytton, 1980; Maccoby, 1992; Maccoby & Martin, 1983). According to Kopp (1982), between 12 and 18 months of age, children become capable of control, which encompasses the awareness of social demands and the ability to initiate, maintain, and cease behavior, and to comply with caregivers' requests. By 24 months, they acquire self-control, which further includes the ability to delay on request and begin to regulate behavior, even in the absence of external monitors. At 36 months, children begin to be capable of self-regulation, or flexibility of control processes that meet changing situational demands.

Compliance with caregivers' requests is a prototypic form of early self-regulation, because it requires the capacity to initiate, cease, or modulate one's behavior in accord with parental standards (Emde, Johnson, & Easterbrooks, 1987; Gralinski & Kopp, 1993; Kopp, 1982). Despite the theoretically recognized importance of the transition from externally to internally regulated actions, the large majority of research on early self-regulation and compliance, including our own (Kochanska & Aksan, 1995; Kochanska, Aksan, & Koenig, 1995; Kuczynski, Kochanska, Radke-

Yarrow, & Girnius Brown, 1987) has focused on relatively narrow developmental periods. In addition, few investigations have been longitudinal. Vaughn, Kopp, and Krakow (1984) examined the development of self-control from 18 to 30 months of age, but that study was cross-sectional. Kaler and Kopp (1990) performed a cross-sectional study of compliance in young toddlers from 12 to 18 months of age. Gralinski and Kopp (1993) collected rich data on mothers' rules and children's compliance in two cohorts, younger (13, 18, 24, and 30 months) and older (30, 36, 42, and 48 months), but those data were based on maternal report. Klimes-Dougan and Kopp (1999) reported observational data from that study, but they focused mostly on children's conflict resolution strategies rather than on compliance. No study has longitudinally examined the development of compliance from late infancy through preschool age using observational paradigms. The first objective of this research was to provide a comprehensive description of early compliance in a large group of normally developing children, using observational methods in various naturalistic contexts, in a longitudinal design, with assessments at 14, 22, 33, and 45 months of age.

The approach of the present study was based on a recent conceptual model that postulated motivational heterogeneity within compliance (Kochanska & Aksan, 1995; Kochanska et al., 1995). We proposed that

compliance encompasses two motivationally distinct forms, committed and situational compliance. Committed compliance describes children's behavior when they embrace the maternal agenda, accept it as their own, and eagerly follow maternal directives in a self-regulated way—reminiscent of “receptive compliance” (Maccoby and Martin, 1983) or “mature compliance” (Crockenberg, 1991). Situational compliance describes instances when children, although essentially cooperative, do not appear to embrace wholeheartedly the maternal agenda. Such compliance is “shaky” and seems contingent on sustained maternal control.

Early parental “Dos” and “Don'ts” pose different regulatory challenges for young children (Emde et al., 1987; Gralinski & Kopp, 1993). Compliance with those demands has sometimes been labeled, respectively, “production compliance” and “inhibition” (Kopp, 1987). Surprisingly little is known, however, about differences in children's behavior in response to the two kinds of demands.

Children's behavior in Do contexts involves sustaining an unpleasant, tedious activity, whereas their behavior in Don't contexts involves suppressing a prohibited but pleasant activity. Our past work has shown that Do contexts less frequently elicit committed compliance and more frequently elicit situational compliance (Kochanska & Aksan, 1995; Kochanska et al., 1995; Kochanska, Tjebkes, & Forman, 1998). Children's behavior in Do contexts has been found to be generally less mature, less self-regulated, and developmentally trailing considerably behind their behavior in Don't contexts. Taken together, the previous data indicate that Do contexts pose a greater regulatory challenge to young children than Don't contexts.

The second objective of this study was to explore in more depth the differences between the Do and Don't demand contexts. In the Do context, mothers requested that their children perform a tedious, unpleasant activity (cleaning up toys). In the Don't context, mothers prohibited their children from executing attractive, pleasant behavior (touching appealing, easily accessible objects). Assessments were made at 14, 22, 33, and 45 months of age and encompassed several observational paradigms at each time. We examined differences in the means and developmental trajectories of children's committed and situational compliance, expecting that the Do context would be much more challenging than the Don't context. For both forms of compliance, we also examined the concurrent correlations across the two demand contexts for individual children, and the longitudinal continuity. We expected that compliance, both committed and situational, would be stable within a given context but not necessarily across contexts.

In this study, a new effort was made to understand the nature of the differences between the two types of regulatory demands, Do and Don't. We proposed that self-regulatory abilities involved in sustaining behavior and those involved in suppressing behavior may be differently related to two inhibitory temperament systems in children, one based on fear and one based on effortful control (Kochanska, 1993; Rothbart & Bates, 1998).

Links between *fearfulness* and suppressing behavior have been shown in early learning models (Mowrer, 1960) and in research on psychopathy. A deficient fear system accounts, in part, for poor passive avoidance learning and ineffectiveness of punishment in psychopaths and, ultimately, their inability to suppress prohibited acts (Fowles, 1988, 1994; Gray, 1982; Lykken, 1957; Quay, 1993).

Links between fear and self-regulation, particularly in Don't contexts, is also consistent with research in developmental psychology that has extended processes implicated in psychopathy to normative development. Dienstbier (1984) proposed that fearful children are more easily conditioned to inhibit transgressions. Rothbart and colleagues proposed that temperamental fearfulness underpins children's ability for self-regulation (Derryberry & Rothbart, 1997; Rothbart & Ahadi, 1994; Rothbart, Ahadi, & Evans, 2000; Rothbart & Bates, 1998). Other studies found links between fear and committed compliance (Kochanska & Aksan, 1995), guilt after transgressions (Kochanska, DeVet, Goldman, Murray, & Putnam, 1994), and less cheating (Asendorpf & Nunner-Winkler, 1992). Myers (1922, cited in Kopp, 1987) believed that young children comply with caregivers' requests to cease an ongoing behavior because of fear.

In Rothbart's model (Rothbart, 1989a, 1989b; Rothbart & Ahadi, 1994; Rothbart et al., 2000; Rothbart & Bates, 1998; Rothbart, Derryberry, & Posner, 1994), *effortful control* refers to the temperamental ability to suppress a dominant response and perform a subdominant response. This ability has been implicated in a wide range of self-regulatory outcomes, including various manifestations of emotion regulation and rule-consistent behavior, from toddler to early school age (Kochanska, Murray, & Coy, 1997; Kochanska, Murray, & Harlan, 2000; Kochanska, Murray, Jacques, & Vandegest, 1996). Kochanska et al. (1997) linked effortful control to committed compliance at early school age as well, but in that study, only measures of compliance in the Do context were available.

No study, to our knowledge, has tested differential links between fearfulness and effortful control on the one hand, and committed compliance in Do versus

Don't contexts on the other. Fearfulness was expected to relate mostly to committed compliance in the Don't context. Effortful control, however, has been implicated in both suppressing a prepotent behavior and initiating or maintaining a subdominant behavior (Kochanska et al., 2000), and thus was expected to relate to committed compliance in both Do and Don't contexts. Establishing different temperamental underpinnings of committed compliance in the two contexts would help elucidate the origins of the differences between those contexts. To that end, children's fearfulness was observed at 14, 22, 33, and 45 months, and their effortful control was observed at 22, 33, and 45 months of age; maternal ratings were obtained at 33 and 45 months.

Central in our research program are the implications of our view of compliance as heterogeneous for the controversy on the relation between compliance (in the presence of a socialization agent) and internalization (autonomous, internally regulated, rule-compatible conduct, carried out even without surveillance). Influential theorists such as Kohlberg (e.g., 1969) and Piaget (1932) have viewed compliance and internalization as unrelated. Other influential theorists, such as Lepper (1981), have seen compliance as either promoting or interfering with internalization, depending on the child's attributions. Yet other theorists, such as Kopp (e.g., Gralinski & Kopp, 1993), Lytton (1980), or Stayton, Hogan, and Ainsworth (1971), have viewed compliance as the first step in the unfolding progress toward internalization, a view similar to our own. We see committed compliance as an expression of a more mature stance that reflects the child's unfolding self-regulation and nascent internalization of parental rules. We proposed and demonstrated that committed compliance related to measures of internalized, self-regulated behavior carried out without external surveillance. In contrast, situational compliance either did not relate, or related negatively, to internalization (Kochanska & Aksan, 1995; Kochanska et al., 1995, Kochanska, Tjebkes, et al., 1998).

The third goal of this study was to examine the links between committed and situational compliance and internalization. This goal, however, extended well beyond the replication of past findings. We examined the overall links, as well as the specific links within and across the Do and Don't contexts. To that end, we employed a complete matrix of observational paradigms: the Do and Don't contexts with maternal control, and similar Do and Don't internalization paradigms without maternal control. Analogous tasks called for sustaining a tedious, unpleasant activity or suppressing a pleasant activity. We hypothesized that

committed, but not situational, compliance would relate to internalization, and that these links might be context specific.

Although we have shown links between committed compliance and internalization before (Kochanska & Aksan, 1995; Kochanska et al., 1995; Kochanska, Tjebkes, et al., 1998), we never tested a possibility that third variables may account for those links. In particular, both committed compliance and internalization may relate to maternal use of power. Children of mothers who use more power may show less committed compliance (both as a cause and a result of maternal style), and they may also be less internalized (Bell, 1968; Power & Chapieski, 1986; Hoffman, 1983). To address this possibility was part of the third objective of this study, and marked a new direction in our research. Maternal power was assessed at 14, 22, 33, and 45 months of age.

The fourth objective of the study was to explore an issue we have not addressed before—generalization of children's committed compliance with the mother to other partners of interaction. In past research, we demonstrated that committed compliance represents a child's receptive stance toward the caregiver that generalizes across domains of socialization with the same caregiver. Children who showed high committed compliance in the discipline domain were also more eager to cooperate with their mothers in a teaching domain (Forman & Kochanska, 2001; Kochanska, Tjebkes, et al., 1998). There is an implicit assumption in the literature (Kopp, 1982; Patterson, 1997) that compliance and, more generally, self-regulation in the interaction with the parent is important because it has implications for the child's ability to cooperate with other agents of socialization, such as teachers or other authority figures. An alternative possibility is also viable, however—that committed compliance, which grows out of the early relationship with the caregiver (Kochanska & Aksan 1995; Kochanska et al., 1995), is specific to that relationship. No empirical study has directly addressed this question. To do so, in an exploratory fashion, we examined the relation between committed compliance to the mother and the child's willing cooperation with another adult.

METHOD

Participants

Mothers of term, normally developing infants in intact families volunteered for a study in response to advertisements in the community (newspapers, newsletters, library, day-care centers, health care facilities, and so forth). Participants lived in several counties in

eastern Iowa and were mostly White (mothers, 97%; fathers 92%), but represented a broad SES range in terms of income and education. More details can be found in Kochanska, Coy, Tjebkes, and Husarek (1998). Data reported here were collected when children were age 14 months ($M = 13.65$, $SD = .74$; $N = 108$; 53 girls, 55 boys); 22 months ($M = 22.30$, $SD = .55$; $N = 106$; 53 girls, 53 boys); 33 months ($M = 32.80$, $SD = .53$; $N = 104$; 52 girls, 52 boys); and 45 months ($M = 45.30$, $SD = .73$; $N = 101$; 49 girls, 52 boys).

Overview

There was one laboratory session, approximately 1½ to 2 hr, at 14 months, and two laboratory sessions, each 2½ to 4 hr, within 7 to 10 days, at each of the following assessments: 22, 33, and 45 months. The laboratory consisted of two connected rooms, a naturalistically furnished living room and a sparsely furnished play room.

Children's committed and situational compliance with the mother was observed in Do and Don't contexts. The Do contexts, which involved toy cleanups, occurred after mother-child free play. The mother was instructed to ask the child to pick up the toys and put them back into the appropriate basket or box, and to make it as much the child's job as possible. An abundant number of toys (a different set of toys at each time) had been supplied and spilled on the floor to standardize both the instruction and the requirements of the task. At 14 months, there was one Do context (7 min); at 22, 33, and 45 months there were always two 10-min Do contexts, one during each session.

The Don't contexts encompassed interactive mother-child situations in the living room. The child had easy access to a shelf with very attractive toys, but was prohibited from playing with the toys. As instructed, the mother issued the prohibition upon entry to the room during the first session at each assessment time, and she began the second session by reminding the child about this rule ("introduction of prohibition"). She then enforced it throughout the session. These contexts were structured as follows (from one session at 14 months, and two sessions at 22, 33, and 45 months): at 14 months, introduction of prohibition, 5 min; snack, 10 min; play, 5 min; gift opening, 5 min; at 22, 33, and 45 months, introduction of prohibition, 15 min; mother busy, 10 min; snack, 22 min; play, 10 min; free time, 7 min; gift opening, 4 min (there was an extra 5 min of play at 45 months). The Do and Don't contexts never overlapped (toy cleanups were in the play room, with no access to the prohibited toys).

Internalization was also observed in Do and Don't contexts. The Do context required the child to sustain involvement in an unpleasant task without supervi-

sion (cleanup alone). At 33 and 45 months, after each mother-child toy cleanup, the mother asked the child to finish that chore alone, while she moved to the other room for the next 5 min (we judged that prior to 33 months children would be too young to perform this task).

The Don't context required the child to refrain for 8 min from engaging in a pleasant activity (touching the prohibited toys that were the subject of maternal prohibition in the Don't compliance contexts) without supervision. This paradigm was administered in an identical manner at 14, 22, 33, and 45 months, at the end of the second session.

Children's fearfulness was observed at each time of assessment. The paradigms included exposure to odd masks (14, 22, and 33 months), and exploration in an odd room filled with unusual objects. The latter paradigm also included performing risky, mildly stressful behaviors when encouraged to do so by a stranger (22, 33, and 45 months). At 33 and 45 months, the mother rated the child's shyness.

Children's effortful control was observed at 22, 33, and 45 months, using behavioral batteries of multiple tasks that assessed the ability to delay, slow down, suppress or initiate behavior to signal, or lower voice, as well as effortful attention. Mothers provided the ratings at 33 and 45 months.

Children's cooperation with an adult other than the mother was observed at 33 months. Their willingness to cooperate with the experimenter was coded.

Multiple teams of typically nonoverlapping coders coded the behavioral data. Coders periodically realigned to prevent drift. Reliabilities are reported below for each pair of coders up to two pairs per project; occasionally, more teams were involved, and in those cases, the ranges of reliability are reported.

Children's Compliance with Mother: Do and Don't Contexts (14, 22, 33, and 45 Months)

Coding

The coding system used for the two forms of compliance was adapted from previous research (Kochanska & Aksan, 1995; Kochanska et al., 1995). This system was used at all times of assessment. The behavioral codes in both Do (toy cleanup) and Don't (prohibition) contexts were motivationally equivalent, although the actual behavior differed. In both Do and Don't contexts, 30-s coding segments were used. In the Don't context, the coder first identified every instance in which the child directed attention to (looked, pointed, approached, talked about) the prohibited toys. This marked the onset of an episode,

which was then coded for every 30-s segment until the child reoriented (the average numbers of Don't segments are reported below). The predominant form of child behavior was coded (several noncompliance codes were included, but here the focus was only on the two forms of compliance: committed and situational).

Committed compliance. Committed compliance was coded in the Do context if the child eagerly picked up toys, put them in the basket, spontaneously moved from one pile of toys to the next, beamed, and/or clapped hands after putting toys in the basket. It was coded in the Don't context if the child looked but did not attempt to touch, said "no-no toys" or "no touch" (or something to that effect), and/or turned away spontaneously.

Situational compliance. Situational compliance was coded in the Do context if the child cooperated, but somewhat half-heartedly, or if the child picked up toys only after maternal intervention, without which the child's attention slipped, and the child began to play or orient away from the task. Situational compliance was coded in the Don't context if the child ceased to touch in response to maternal control, but compliance seemed "shaky," and the child soon began to hover around the shelf and touch the toys.

Reliability

Kappas for child behavior at 14 months for the Do and Don't contexts, respectively, were .73 and .71; at 22 months, they ranged from .65 to .70 for Dos and from .65 to .82 for Don'ts; at 33 months, κ s ranged from .75 to .78 for Do's, and from .65 to .77 for Don'ts; and at 45 months, κ s were .78 for Do's and ranged from .82 to .86 for Don'ts. In terms of identifying the episodes, the percentages of the codable segments in the Don't context marked identically by the independent coders were 83% at 14 months, 93 to 97% at 22 months, 87 to 96% at 33 months, and 89 to 96% at 45 months.

Data Reduction

Tallied codes were divided by the number of coded segments in each context to create relative scores (see Table 2). The length of the Do contexts varied only slightly—occasionally, the cleanup was a bit shorter than 7 min at 14 months or 10 min at other assessment times. The number of coded segments in the Don't contexts was quite variable, because it depended on how many times the child directed attention toward the prohibited toys and thus triggered the beginning of a coding episode. The mean number of segments was: at 14 months, $M = 8.61$, $SD = 6.32$; at 22 months, Session 1, $M = 17.42$, $SD = 7.21$, and Session 2, $M = 12.71$, $SD = 7.18$; at 33 months, Session 1, $M = 14.12$,

$SD = 6.96$, and Session 2, $M = 9.10$, $SD = 5.35$; and at 45 months, Session 1, $M = 11.36$, $SD = 6.28$, and Session 2, $M = 7.85$, $SD = 4.70$.

Beginning with the 22-month assessment, the scores were averaged across the two sessions. Thus, the Do scores were the means of the two toy cleanups, and the Don't scores were the means of the prohibited objects contexts across both sessions. Children's behavior, by and large, cohered across sessions. At 22 months, Do scores for committed compliance were correlated, $r(106) = .38$, $p < .001$, and for situational compliance, $r(106) = .24$, $p < .025$; Don't scores for committed compliance were $r(106) = .63$, $p < .001$, and for situational compliance, $r(106) = .29$, $p < .002$. At 33 months, Do scores for committed compliance were correlated, $r(103) = .38$, $p < .001$, and for situational compliance, $r(103) = .28$, $p < .005$; Don't scores for committed compliance were $r(103) = .56$, $p < .001$, and for situational compliance, $r(103) = .44$, $p < .001$. At 45 months, Do scores for committed compliance were correlated, $r(101) = .21$, $p < .05$, and for situational compliance, $r(101) = .20$, $p < .05$; Don't scores for committed compliance were $r(101) = .39$, $p < .001$, and for situational compliance, $r(101) = .19$, $p < .10$.

Maternal Power Assertion (14, 22, 33, and 45 Months)

The mother's style of influence was coded with respect to her use of power, in the same contexts as child compliance (Do and Don't), and using the same 30-s coding segments. The coding system was adapted from previous work (Kochanska & Aksan, 1995; Kochanska et al., 1995).

Coding

For each coded 30-s segment, two kinds of codes were used: a global rating of maternal control style (one code per coded segment) and the codes of all physical interventions the mother used during the segment (more than one type could be coded per segment). Here, the focus was only on codes expressing forceful or power-assertive control. The global ratings included assertive control (mother controlled in an assertive, firm manner) and forceful control (mother used power or threatened; negative or angry control). Other global codes, not considered here, included no interaction, social exchange but no control, and gentle guidance. The power-assertive physical intervention codes included assertive physical control (held child firmly, moved child decisively, removed a toy from child's hand, and so forth) and forceful physical control (shook, slapped, or spanked child; handled child

roughly; yanked child; used frightening, angry gestures toward child). Other physical intervention codes, not considered here, included no physical control, distal physical signals, and gentle physical control.

Reliability

For the global ratings, reliability was as follows: at 14 months, $\kappa = .57$; at 22 months, $\kappa = .65-.81$; at 33 months, $\kappa = .71-.85$; and at 45 months, $\kappa = .80-.87$. For the physical interventions, reliabilities were: at 14 months, $\kappa = .74$, at 22 months, $\kappa = .65-.83$; at 33 months, $\kappa = .69-.77$; and at 45 months, $\kappa = .82-.87$.

Data Aggregation

First, for each Do and Don't context, all instances of the power-assertive physical intervention codes were counted and tallied, and each tally was divided by the number of coded segments (in the Do and Don't contexts), averaged across two sessions where applicable, and standardized. Then averages were obtained, first across the two global power scores, and then across the two physical power scores, for the Do and Don't contexts separately. Next, one general power score for the Do context and an analogous score for the Don't context were created. Each was an average across the global and physical intervention scores. These composite scores converged: at 14 months, $r(108) = .30, p < .002$; at 22 months, $r(106) = .60, p < .001$; at 33 months, $r(104) = .40, p < .001$; and at 45 months, $r(101) = .35, p < .001$. Finally, averages across these general power scores were obtained, creating one score for maternal power at each time of assessment.

Internalization Measures

Internalization in the Do Context (33 and 45 Months)

At the end of the mother-child toy cleanup during each laboratory session, mothers asked their children to finish the task by themselves, and went to the other room. Children were then left alone for 5 min (there were always toys left to be cleaned up).

Coding. Several behaviors were coded for each 10-s segment; self-regulated, eager picking up of toys was the only behavior used in this report. Reliability κ s were .85 at 33 months and .96 at 45 months.

Data reduction. The internalization codes were tallied and divided by the number of the coded segments; these scores were averaged across the two sessions, given that they correlated: at 33 months, $r(103) = .50, p < .001$; at 45 months, $r(101) = .19, p = .052$. This

process produced the scores for internalization in the Do context.

Internalization in the Don't Context (14, 22, 33, and 45 Months)

This paradigm was parallel at 14, 22, 33, and 45 months. At the end of the second session, the child was observed alone with the prohibited toys for 8 min. Before the mother went to the adjoining room she again issued the prohibition and asked the child to engage in a dull sorting activity while she was gone. The mother sat behind the closed door; if the child became upset, the door was opened slightly to reveal the mother sitting with her back to the child. The child was alone for 1 min; then, an unfamiliar female entered, played with three toys (1 min), and left. The child was alone again for 6 min.

Coding. The child's behavior was coded for each of 96 5-s segments, using six mutually exclusive codes: looked at toys without touching, engaged in other activity, engaged in sorting activity, touched toys gently, self-corrected (began to touch but terminate the attempt spontaneously), and deviated (played with the toys). Latency to deviate was also coded. The relatively rare segments in which the child tried strongly to get on the mother's lap, or was on her lap, not oriented toward the prohibited objects and not moving freely around the room were recorded but not included.

Reliability. Reliability for child behavior was as follows: at 14 months, $\kappa = .94$ and $.95$; at 22 months, $\kappa = .94$ and $.95$; at 33 months, $\kappa = .96$; and at 45 months, $\kappa = .92$.

Data reduction. First, relative scores for each of the coded behaviors were created by dividing the respective tallies by the number of coded segments in which the child was moving freely around the living room (96 minus the number of segments on the mother's lap). These relative scores for all behaviors, and latencies to deviate, were then submitted to Principal Components Analysis (PCA). The first factors produced by the PCA were very similar at all ages, and they clearly expressed the child's internalization. At every age, this factor incorporated negative loading on deviation, and positive loadings on looking without touching and latency to deviate. Thus, for each child, scores on the first factor at each age were used as the measures of internalization in the Don't context (see Table 1).

Observed Fearfulness (14, 22, 33, and 45 Months)

Risk Room (22, 33, and 45 Months)

This paradigm was modeled after the original research by Kagan (e.g., Kagan, Reznick, & Gibbons,

Table 1 Internalization Factor in the Don't Context: Principal Components Analyses (PCA)

Coded Behavior	First Factor in PCA			
	14 Months (<i>n</i> = 108)	22 Months (<i>n</i> = 106)	33 Months (<i>n</i> = 104)	45 Months (<i>n</i> = 101)
Deviation ^a	-.86	-.88	-.92	-.84
Looking/no touching ^a	.29	.64	.68	.69
Other activity	.86	.77	.61	
Sorting activity				.33
Gentle touching		-.44		-.33
Latency to deviate ^a	.81	.82	.79	.87
Eigenvalue	1.24	1.25	1.27	1.37
Percentage of variance	17.8	17.8	18.1	19.5

Note: Loadings under .25 were suppressed. Self-correction did not load on the first factor at any age.

^a Coded behaviors that loaded on the first factor at every age.

1989), and adapted from the earlier work of Kochanska (1995). At the beginning of the first laboratory session, the child was observed in an unfamiliar room containing several odd-looking objects. The objects were different at each time of assessment, but always had an odd and mildly unusual quality (toy characters wearing masks, a black box covered by "spider webs," a slide decorated with plastic reptiles, a tunnel, peculiar masks, and so forth). The child first explored freely for 3 min. An unfamiliar adult female then entered and encouraged the child to perform several "Risky Acts," after first modeling them for the child. These were mildly stressful behaviors, different at each time but always including an element of unfamiliarity and mild risk. For example, the child was encouraged to climb the ladder; put a hand in the black box or in the mask's mouth; fall backward on a trampoline; allow direct physical contact (put blood pressure cuff on, measure the head's circumference); get inside an unusual car; touch a remotely controlled, large, unusual toy; or put on masks). For each Risky Act, up to three standard prompts were issued. Finally, another adult in an unusual full-body costume (clown, M&M candy, cow) entered the room and attempted to interact with the child.

Coding. Throughout the paradigm, the child's proximity to the mother was coded for each 30-s segment. During the first 3 min, latency to explore and the presence or absence of exploration were coded in each 30-s segment; extra credits were given for touching more frightening objects. Each Risky Act was coded using an overall score of reluctance. The lowest score indicated the least reluctance, or fearfulness (performed before the first prompt) and the highest score indicated the most reluctance, or fearfulness (never performed). A point was added if the child expressed distress when prompted.

Reliability. Reliability was as follows: at 22 months, $\kappa_s = .78$ for proximity, .89 for exploration, and .91 for Risky Acts; at 33 months, $\kappa_s = .98$ for proximity, 1.00 for exploration, and .96 for Risky Acts; at 45 months, $\kappa_s = .89$ for proximity, .89 for exploration, and .87 for Risky Acts. The latencies were coded within 1 s difference in 100% of cases at all ages.

Data reduction. The number of segments in which the child was within arm's length of the mother, latency to explore, exploration (a reversed score), and Risky Act scores converged: Cronbach's α_s at 22, 33, and 45 months of age were, respectively, .84, .85, and .89. They were standardized and averaged into one Risk Room fearfulness composite at each age.

Masks (14, 22, and 33 Months)

Additionally, we used a fearfulness paradigm (Masks) adapted from the Laboratory Temperament Assessment Battery (LAB-TAB; Goldsmith & Rothbart, 1996). At 22 and 33 months, this paradigm was administered during the second laboratory session, and at 14 months during the only laboratory session (by 45 months, the children were too old). The experimenter put on four consecutive masks (ghost, clown, gorilla, gas mask) for 10 s each, and leaned slightly toward the child, while saying his or her name.

Coding. Latency to first fear response, discrete escape behaviors, and average and peak intensity of facial, vocal, and bodily fear were coded. For reliability, 83% of the latencies at 14 months, and 100% at 22 months and 33 months were scored within 2 s. Kappas for the discrete behaviors and for intensity scores ranged from .54 to .85 at 14 months, .83 to .97 at 22 months, and .83 to 1.00 at 33 months.

Data reduction. For each age, a composite of standardized reversed latency to fear, the sum of discrete

fear behavior, and already aggregated (across facial, vocal, and bodily fear scores) intensity and peak scores was created. These Masks fearfulness scores had high internal consistency: α s were .70 at 14 months, .80 at 22 months, and .85 at 33 months.

Overall Observed Fearfulness Scores

At 22 and 33 months, two measures, from two different sessions at each age, were available (the Risk Room fearfulness and Masks fearfulness scores); therefore, these scores were averaged. The two scores correlated: at 22 months, $r(106) = .25, p < .01$; at 33 months, $r(104) = .40, p < .001$. At 14 and 45 months, one measure was available for the Masks score and the Risk Room score, respectively, and these were used. These overall scores captured a stable characteristic: from 14 to 22 months, $r(106) = .28, p < .005$; from 22 to 33 months, $r(104) = .60$; and from 33 to 45 months, $r(101) = .52, ps < .001$.

Mother-Rated Shyness (33 and 45 Months)

Mothers filled out the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994). In this report, the overall score on the 13-item shyness scale ($\alpha = .93$) that most closely corresponded to the observed measures was used. Maternal reports of shyness converged with observed fearfulness scores: at 33 months, $r(104) = .47, p < .001$; at 45 months, $r(101) = .40, p < .005$. The reports were longitudinally stable, $r(104) = .65, p < .001$.

Observed Effortful Control (22, 33, and 45 Months)

Batteries of tasks (most were multitrial) were used to assess effortful control. There were 6 tasks at 22 months, 11 at 33 months, and 14 at 45 months; these tasks were interspersed with other contexts during the laboratory sessions. The details of tasks and coding are described in Kochanska, Murray, and Harlan (2000), and can be obtained from the first author. The tasks captured five components of effortful control, each of which required the child to suppress the dominant response and perform, instead, a subdominant response. *Delaying* tasks involved waiting for a pleasant event, such as reaching for an M&M under a cup, chewing an M&M placed on the tongue, unwrapping gifts, or choosing a toy (3 tasks at 22 months, 5 tasks at 33 months and 45 months). *Slowing down* tasks called for slowing fine or gross motor activity, such as walking or drawing (1 at 22 months, 3 at 33 months, 3 at 45 months). *Suppressing/initiating activity to signals* were "Go—No Go" tasks that called for producing a response to one type of signal and inhibiting a response

to another, for example "Simon Says," a game involving taking turns, or responding differently to red and green signs (1 at 22 and 33 months, 3 at 45 months). The *lowering voice* task involved whispering (1 task each at 33 and 45 months). *Effortful attention* tasks were Stroop-like paradigms that required ignoring a dominant perceptual feature of a stimulus for the sake of a subdominant feature (1 each at 22 and 33 months, 2 at 45 months). Every task was presented as a fun game or challenge, and not as a prohibition or request, and children were given positive feedback regardless of how they performed.

Coding

Each trial was coded so that the higher score reflected better capacity for effortful control. The scores were then averaged across trials, where applicable. Reliability of coding was extremely high across all three ages: all κ s were above .88, except in two instances (.74 and .53).

Data Reduction

The tasks converged increasingly as children matured: Cronbach's α s were .42, .77, and .79, respectively, at 22, 33, and 45 months. Thus, all scores were standardized and averaged into one composite of *effortful control* at each age. This composite was longitudinally stable: from 22 to 33 months, $r(104) = .44$; from 33 to 45 months, $r(101) = .80, ps < .001$.

Mother-Rated Effortful Control (33 and 44 Months)

The overall score on the 13-item effortful control CBQ scale ($\alpha = .78$) converged with the observed fearfulness scores: at 33 months, $r(104) = .44$; at 45 months, $r(101) = .43, ps < .001$. This score was longitudinally stable, $r(104) = .76, p < .001$.

Fearfulness and effortful control were themselves modestly related. The concurrent correlations for the observed measures ranged from $r(106) = .17, p < .10$, to $r(104) = .27, p < .01$; correlations for the mother-rated measures ranged from $r(100) = .15, ns$, to $r(104) = .26, p < .01$.

Cooperation with an Adult (33 Months)

During the laboratory sessions, the child's cooperation with an adult other than the mother (the female experimenter who conducted the session) was coded in eight situations in which she asked the child to disengage from one (enjoyable) laboratory paradigm and to engage in the next paradigm or task.

Coding

During each transition, the child's willing cooperation with the adult was coded on a 4-point scale (3 = highly cooperative, no reluctance or hesitation; 2 = cooperative, slightly reluctant; 1 = moderately reluctant; 0 = uncooperative, highly reluctant; $M = 2.65$, $SD = .39$). The reliability κ was .89.

Objective markers of the ease of the transitions were also used. One was the length of each transition ($M = 91.47$ s, $SD = 23.67$; 96% were coded within a 3-s difference). The other was the overall length of the session. This was greatly influenced by how cooperative the child was toward the experimenter. This judgment was based on the time stamps on the videotapes ($M = 235.62$ min, $SD = 18.42$).

Data Reduction

For each session, the willing cooperation scores and the transition length score were each averaged across all transitions; the transition length was reversed, as was the session length. All scores (stan-

dardized) were aggregated, $\alpha = .78$, into a score of *cooperation with another adult*. The descriptive statistics for the study's variables are in Table 2.

RESULTS

Overview

The analyses encompassed several steps. In the first, descriptive step, gender effects and developmental changes in children's compliance from 14 to 45 months in the Do and Don't contexts were examined using a comprehensive, doubly multivariate MANOVA. The significant multivariate effects were followed by specific multi- and univariate tests to clarify their direction.

The second step involved analysis of the specificity of the Do and Don't demand contexts. Two issues were addressed. For each form of compliance (committed and situational), the links across the Do and Don't contexts at 14, 22, 33, and 45 months were explored. In addition, the longitudinal continuity of these links (from 14 to 45 months) was examined, again within both Do and Don't contexts: Context-

Table 2 Descriptive Data for All Measures

	14 Months (<i>n</i> = 108)		22 Months (<i>n</i> = 106)		33 Months (<i>n</i> = 104)		45 Months (<i>n</i> = 101)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Compliance with mother ^a								
Do context								
Committed	.14	.17	.21	.18	.21	.19	.29	.19
Situational	.14	.12	.27	.15	.31	.15	.32	.13
Don't context								
Committed	.40	.31	.78	.23	.90	.16	.85	.15
Situational	.09	.15	.09	.10	.04	.07	.04	.07
Overall (across Do and Don't)								
Committed	.27	.19	.50	.15	.56	.12	.57	.12
Situational	.12	.09	.18	.09	.17	.08	.18	.07
Maternal power ^b	.00	.51	.00	.65	.00	.58	.00	.56
Internalization								
Do context ^a								
Do context ^a	—	—	—	—	.20	.27	.26	.26
Don't context ^c								
Don't context ^c	.00	1.00	.00	1.00	.00	1.00	.00	1.00
Observed fearfulness ^b	.00	.65	.00	.52	.00	.58	.00	.73
Mother-rated shyness ^d	—	—	—	—	3.95	1.16	3.92	1.15
Observed effortful control ^b			.00	.45	.00	.52	.00	.51
Mother-rated effortful control ^d	—	—	—	—	4.24	.67	4.47	.70
Cooperation with other adult ^b	—	—	—	—	.00	1.00	—	—

Note: Committed and situational compliance percentages do not add up to 100%, because several forms of noncompliance were also coded.

^a Values are percentages of coded segments.

^b Values are composites of standardized scores; all constituent raw scores are available from the first author.

^c Values are factor scores.

^d Values are scale scores from the Child Behavior Questionnaire.

specific effects were expected. Fearfulness and effortful control as the underpinnings of committed compliance were also explored; we expected that fearfulness would be significant in the Don't context, but not in the Do context, and that effortful control would be significant in both contexts.

In the third step, we tested the prediction that, regardless of the demand context, only committed compliance would relate, concurrently and longitudinally, to internalization, and situational compliance either would not relate or would relate negatively to internalization. Links between committed compliance only and internalization were then re-examined, both within and across the Do and Don't contexts; these links were expected to be context specific.

In the fourth step, we tested the possibility that the links between committed compliance and internalization might be due to lower maternal power assertion, which might be correlated with both children's lower committed compliance and children's lower internalization. In this report, we did not propose or test mediational hypotheses. We simply tested whether the relations between committed compliance and internalization remained significant after maternal power was controlled. Given that both may be correlated with maternal power, the correlation between them could have been spurious; however, this turned out not to be the case.

The fifth and final step was the exploratory analysis of the links between committed compliance to mother and the degree of cooperation with another adult.

Descriptive Analyses of the Development of Compliance from 14 to 45 Months: Form of Compliance, Time of Assessment, Demand Context, and Gender

First, an overall omnibus MANOVA was conducted. The two forms of child compliance, committed and situational, at 14, 22, 33, and 45 months, in both Do and Don't contexts, were entered as the dependent variables. The form of compliance (2: committed versus situational), type of demand context (2: Do versus Don't), and time of assessment (4: 14, 22, 33, and 45 months) were the within-subjects factors. Gender was the between-subjects factor. Each section that follows begins with a description of the overall effects revealed by the analysis. Most of the corresponding means are shown in Table 2.

Gender Effects

Gender was significant in this analysis, $F(1, 99) = 18.97, p < .001$, and in most analyses described below

(it was entered routinely to control for its impact). Generally, girls were higher than boys on committed compliance (composite across Do and Don't contexts): at 14 months, $M = .33, SD = .20$ for girls versus $M = .22, SD = .17$ for boys; at 22 months, $M = .55, SD = .13$ for girls versus $M = .44, SD = .15$ for boys; and at 33 months, $M = .59, SD = .11$ for girls versus $M = .52, SD = .13$ for boys. Girls were not higher on committed compliance at 45 months. Girls and boys did not differ in situational compliance (composite across Do and Don't contexts) at any age.

The gender effects were dependent on the context, as reflected in the interaction of gender, type of compliance, and context, $F(1, 99) = 4.89, p < .05$. In the Do context, girls were higher in committed compliance only at 14 months, but not thereafter. There were no gender differences in situational compliance. In the Don't context, however, the gender differences were pronounced at every age: Girls were higher than boys in committed compliance and lower than boys in situational compliance.

Committed and Situational Compliance: The Do and Don't Contexts

There was a multivariate effect of interaction between form of compliance and demand context, $F(1, 99) = 844.94, p < .001$, reflecting significant differences between the forms of children's compliance in the two contexts, Do and Don't. The MANOVA was followed by repeated measures ANOVAs, for each time of assessment, comparing the two contexts. Committed compliance was higher in the Don't context than in the Do context at every age (14, 22, 33, and 45 months). The opposite was true for situational compliance; it was higher in the Do context than in the Don't context at every age.

Another way of representing this interaction was to compare the means of committed and situational compliance at each age, for the Do and Don't contexts using a series of repeated measures ANOVAs. In the Do context, children showed relatively similar levels of committed and situational compliance at 14 and 45 months; at 22 and 33 months, situational compliance surpassed committed compliance, $F(1, 104) = 5.59, p < .025$ at 22 months, and $F(1, 102) = 14.78, p < .001$ at 33 months. In the Don't context, however, committed compliance greatly surpassed situational compliance at every age; all F s were significant at $p < .001$.

Committed and Situational Compliance: Changes over Time

There was also a multivariate effect of interaction between the form of compliance and time of assess-

ment, $F(3, 297) = 47.16, p < .001$, indicating significant changes over time in the forms of compliance, regardless of context. To “unpack” this interaction, two repeated measures ANOVAs were conducted. In the first analysis, the scores for committed compliance at 14, 22, 33, and 45 months of age were entered (the composite scores that had been averaged across the Do and Don’t contexts); time of assessment was the within-subjects factor, and gender was the between-subjects factor. In the second, analogous analysis scores for situational compliance were entered.

The effect of time was significant for each form of compliance, indicating developmental changes in both committed, $F(3, 97) = 85.55, p < .001$, and situational compliance, $F(3, 97) = 12.42, p < .001$. The subsequent Paired t tests, however, revealed the differences in developmental trajectories that were responsible for the Form of Compliance \times Time of Assessment interaction.

Committed compliance made significant developmental gains between 14 and 22 months (27% to 50%), and between 22 and 33 months (to 56%), but then leveled off at 45 months (57%). Situational compliance increased between 14 and 22 months from 12% to 18%, and leveled off from 33 months (17%) to 45 months (18%).

Committed and Situational Compliance: Changes over Time in the Do and Don’t Contexts

There was an overall significant interaction of the form of compliance, time of assessment, and context, $F(3, 97) = 59.73, p < .001$, indicating that developmental changes were different for the two forms of compliance in the Do and Don’t contexts, as shown in Figure 1.

To clarify this interaction, two MANOVAs were conducted, one for committed compliance and one for situational compliance. In each MANOVA, the scores for Do and Don’t contexts for each time of assessment (14, 22, 33, and 45 months) were entered. The context and time of assessment were the within-subjects factors, and gender was the between-subjects factor. The interaction between context and time was significant for both committed compliance, $F(3, 97) = 44.26, p < .001$, and situational compliance, $F(3, 97) = 36.12, p < .001$. These MANOVAs were followed by paired t tests.

Committed compliance rose by 15% (from 14% to 29%) between 14 and 45 months in the Do context, with significant changes between 14 and 22 months and between 33 and 45 months, but no change from 22 to 33 months. In the Don’t context, however, committed compliance rose by 45% (from 40% to 85%), with significant gains at every time of assessment.

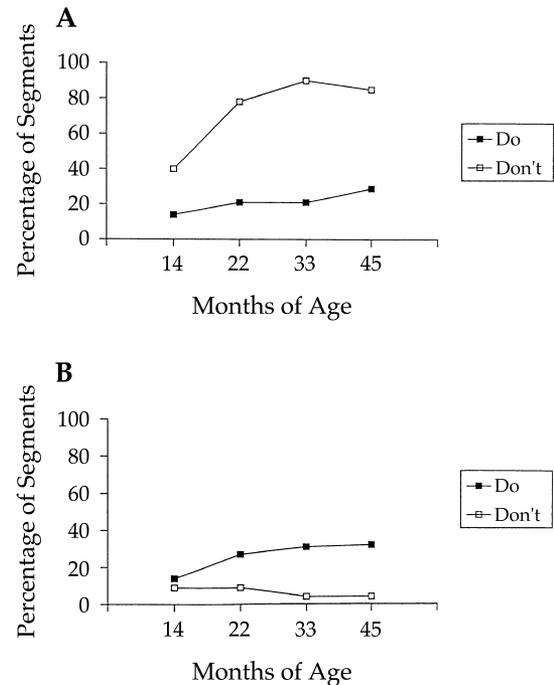


Figure 1 Means of (A) committed and (B) situational compliance at 14, 22, 33, and 45 months in the Do and Don’t contexts.

Situational compliance in the Do context increased by 18% (from 14% to 32%) across the assessment times. Significant gains occurred between 14 and 22 months, and between 22 and 33 months, after which the gains leveled off. In the Don’t context, situational compliance decreased by 5% over time (from 9% to 4%), with a significant decrease between 22 and 33 months.

Analysis of the Specificity of the Do and Don’t Demand Contexts

Contemporaneous and Longitudinal Links within and across Demand Contexts

We first examined the links within and across the Do and Don’t demand contexts for each form of compliance. The correlations are shown in Table 3. For both forms of compliance, the links were almost exclusively within the same context.

Committed compliance was uncorrelated across the two contexts, either contemporaneously or longitudinally. The only exception was one modest concurrent link at 14 months. Committed compliance was longitudinally stable, but only within the same demand context. In the Do context, it was longitudinally stable across the four assessment times (four out of six

Table 3 Compliance with Mother in the Do and Don't Contexts: Correlations across Contexts and over Time

	Do Context				Don't Context			
	14 Months	22 Months	33 Months	45 Months	14 Months	22 Months	33 Months	45 Months
Committed compliance								
Do context								
14 months		.15	.26***	.07	.21*	.17+	-.02	.17+
22 months			.25***	.30***	.14	.14	.01	.09
33 months				.26***	.01	.09	-.03	.15
45 months					.10	-.07	-.11	-.06
Don't context								
14 months						.15	.17+	.27***
22 months							.44****	.55****
33 months								.46****
Situational compliance								
Do context								
14 months		.24**	.02	-.09	-.09	.08	-.05	-.07
22 months			.35****	.26***	.00	-.07	-.19+	.01
33 months				.35****	-.14	-.25**	-.21*	-.09
45 months					-.03	-.18+	-.14	-.19+
Don't context								
14 months						.08	.08	.21*
22 months							.34****	.43****
33 months								.32****

Note: *ns* were: 108 at 14 months, 106 at 22 months, 104 at 33 months, and 101 at 45 months.

* $p < .05$; ** $p < .025$; *** $p < .01$; **** $p < .001$; + $p < .10$.

correlations were significant). It was also longitudinally stable in the Don't context, with four significant correlations and one marginal.

Situational compliance was uncorrelated across contexts; in fact, at 33 months the concurrent correlation was negative, and at 45 months there was a negative trend. Again, longitudinal stability across assessments occurred only within the same context. Four out of six correlations were significant within the Do context, and four were significant within the Don't context.

Links between Committed Compliance and Fearfulness and Effortful Control

The findings for this analysis are presented in Table 4. As predicted, there were multiple positive associations between the measures of observed fearfulness and mother-rated shyness and committed compliance that involved refraining from engaging in an attractive but prohibited behavior (the Don't context), but there were no correlations with measures of committed compliance in the Do context.

There were also multiple positive links between effortful control and committed compliance. As with observed fearfulness, most of these links were with compliance in the Don't context, although there were two significant associations and one marginal association with committed compliance in the Do context.

Links between Compliance and Internalization

Committed versus Situational Compliance and Internalization

We first examined the correlations between the forms of child compliance, committed and situational (using the total scores, averaged across the Do and Don't demand contexts), and the measures of internalization without surveillance. The findings are presented in Table 5. The pattern of results clearly supports the predictions.

There were many significant positive associations, both concurrent and longitudinal, between committed compliance and internalization. Among 24 correlations, 12 were significant and 6 were marginal. In contrast, there were no significant positive correlations between situational compliance and internalization; in fact, there were two significant negative correlations.

Context-Specific Links between Committed Compliance and Internalization

As predicted, most of the links between committed compliance and internalization were quite context specific. The findings are shown in Table 6.

Although occasionally there were links across contexts, most significant correlations were context specific. Children who had high committed compliance

Table 4 Committed Compliance with Mother in the Do and Don't Contexts: Relations with Fearfulness and Effortful Control

	Do Context				Don't Context			
	14 Months	22 Months	33 Months	45 Months	14 Months	22 Months	33 Months	45 Months
Fearfulness								
Observed								
14 months	.16	.05	.09	-.01	.08	.13	.07	-.11
22 months	.11	.11	.02	-.07	.14	.38****	.39****	.25**
33 months	.03	.13	-.07	.03	.15	.20*	.20*	.20*
45 months	-.02	.10	.03	.04	.10	.18 ⁺	.14	.16
Mother-rated shyness (CBQ)								
33 months	.15	.15	.11	.13	.20*	.16	.20*	.28***
45 months	.07	.07	.09	.12	.10	.10	.13	.26***
Effortful control								
Observed								
22 months	.28***	.21*	.10	.00	.22**	.36****	.15	.33****
33 months	.16	.06	.12	-.03	.20*	.33****	.33****	.31***
45 months	.14	.18 ⁺	.11	-.04	.25***	.44****	.35****	.40****
Mother-rated (CBQ)								
33 months	.11	-.08	-.10	-.18 ⁺	.05	.30***	.34****	.11
45 months	.08	-.01	-.09	-.11	.01	.27***	.27***	.15

Note: *ns* were: 108 at 14 months, 106 at 22 months, 104 at 33 months, and 101 at 45 months. CBQ = Child Behavior Questionnaire.
p* < .05; *p* < .025; ****p* < .01; *****p* < .001; +*p* < .10.

in the Do context with their mothers also showed significantly more internalization in the Do context while alone. Children who had high committed compliance in the Don't context with their mothers also showed significantly more internalization in the Don't context while alone.

Committed and Situational Compliance, Maternal Power, and Internalization

To address the possibility that the relations between committed compliance and internalization might be due to the fact that they were both linked

to low maternal use of power, we first examined univariate correlations between maternal power assertion on the one hand and compliance and internalization on the other hand. The data are presented in Table 7. There were indeed several significant negative correlations between maternal use of power and children's committed compliance as well as between mother's use of power and their children's internalization. Therefore, to examine the relations between compliance and internalization, controlling for maternal power, multiple regressions were conducted. To gain a comprehensive view, composites over time were created for both predictor and outcome measures.

Table 5 Committed and Situational Compliance with Mother: Relations with Measures of Internalization

Internalization	Committed Compliance				Situational Compliance			
	14 Months	22 Months	33 Months	45 Months	14 Months	22 Months	33 Months	45 Months
Do context								
33 months	.15	.24**	.40****	.19 ⁺	-.01	-.14	-.06	.03
45 months	.19 ⁺	.17 ⁺	.32****	.43****	.03	-.04	.03	-.04
Don't context								
14 months	.14	.24**	-.05	.02	-.14	-.12	.01	.18 ⁺
22 months	.16	.33****	.21*	.18 ⁺	-.04	.01	-.04	.01
33 months	.23**	.37****	.28***	.12	-.24**	-.15	.01	.04
45 months	.19 ⁺	.24**	.18 ⁺	.27***	-.24**	-.12	-.08	-.06

Note: Committed and situational compliance scores are the composites across the Do and Don't contexts. *ns* were: 108 at 14 months, 106 at 22 months, 104 at 33 months, and 101 at 45 months.
p* < .05; *p* < .025; ****p* < .01; *****p* < .001; +*p* < .10.

Table 6 Committed Compliance with Mother in the Do and Don't Contexts: Relations with Measures of Internalization

Internalization	Do Context				Don't Context			
	14 Months	22 Months	33 Months	45 Months	14 Months	22 Months	33 Months	45 Months
Do context								
33 months	.21*	.14	.39****	.07	.07	.21*	.15	.21*
45 months	.01	.20*	.28***	.44****	.23**	.07	.15	.12
Don't context								
14 months	.03	.22**	-.17 ⁺	-.08	.16 ⁺	.16	.12	.15
22 months	.02	.10	.08	.05	.19 ⁺	.37****	.23**	.22**
33 months	.21*	.18 ⁺	.07	-.10	.17 ⁺	.36****	.34****	.32****
45 months	.11	.13	.04	.04	.18 ⁺	.22*	.23**	.38****

Note: *ns* were: 108 at 14 months, 106 at 22 months, 104 at 33 months, and 101 at 45 months.
 p* < .05; *p* < .025; ****p* < .01; *****p* < .001; +*p* < .10.

On the predictor side, because both committed and situational compliance were longitudinally stable within the Do and Don't contexts (see Table 3), four composites were created, one for each form of compliance and each context across the assessments at 14, 22, 33, and 45 months. Maternal power was also longitudinally stable, average intermeasure correlation was .32. Thus, one composite of maternal power across all four times was created.

Similarly, the outcome measures of internalization were longitudinally stable—cleanup alone at 33 and 45 months correlated, $r(101) = .24, p < .025$; the four

prohibited toys internalization factor scores were modestly stable; average intermeasure correlation was .21. Thus, internalization composites across all four assessment times were created for the Do context, the cleanup alone across the 33- and 45-month scores, and for the Don't context.

We also wished to ensure that the links between committed compliance and internalization in the Don't context were not due to some children being simply more or less interested in the prohibited toys, because this might have influenced their behavior both with and without their mothers. Therefore, we

Table 7 Correlations between Mother's Power, and Children's Committed and Situational Compliance and Internalization

	Maternal Power			
	14 Months (<i>n</i> = 108)	22 Months (<i>n</i> = 106)	33 Months (<i>n</i> = 104)	45 Months (<i>n</i> = 101)
Committed compliance				
14 months	-.27***	-.09	-.14	-.21*
22 months	-.05	-.33****	-.18 ⁺	-.45****
33 months	-.05	.04	-.46****	-.26***
45 months	-.13	-.07	-.23**	-.42****
Situational compliance				
14 months	-.01	.00	-.04	.20*
22 months	-.10	-.01	-.01	.21*
33 months	-.02	.00	.04	.07
45 months	-.14	-.02	-.04	-.00
Internalization				
Cleanup alone, 33 months	-.01	-.12	-.22**	-.11
Cleanup alone, 45 months	-.07	.10	-.14	-.18 ⁺
Prohibited toys, 14 months	-.21*	-.10	-.05	-.19 ⁺
Prohibited toys, 22 months	.15	-.06	-.21*	-.22*
Prohibited toys, 33 months	-.19 ⁺	-.10	-.29***	-.29****
Prohibited toys, 45 months	-.19 ⁺	.18 ⁺	-.21*	-.32****

p* < .05; *p* < .025; ****p* < .01; *****p* < .001; +*p* < .10.

Table 8 Committed and Situational Compliance in the Do and Don't Contexts and Maternal Power as Predictors of Internalization: Multiple Regressions

Predictors Added	Step 1		Step 2	
	F	β	F	β
Outcome: Overall internalization, Do context				
Child gender	9.76****	-.30	3.08 ⁺	-.17
	$R^2 = .09 F_{ch} = 9.76****$			
	Overall $F(1, 102) = 9.76****$			
Overall Do committed compliance			16.68****	.37
Overall Don't committed compliance			1.21	.14
Overall Do situational compliance			<1	.03
Overall Don't situational compliance			<1	.02
Overall maternal power			<1	-.02
			$R^2 = .25 F_{ch} = 4.10***$	
			Overall $F(6, 97) = 5.29****$	
Outcome: Overall internalization, Don't context				
Child gender	9.16***	-.28	1.10	-.10
Interest in toys ^a	5.83**	-.23	3.70 ⁺	-.17
	$R^2 = .17 F_{ch} = 11.06****$			
	Overall $F(2, 105) = 11.06****$			
Overall Do committed compliance			<1	.04
Overall Don't committed compliance			5.78**	.26
Overall Do situational compliance			<1	-.03
Overall Don't situational compliance			6.07**	-.24
Overall maternal power			<1	-.09
			$R^2 = .38 F_{ch} = 6.58****$	
			Overall $F(7, 100) = 8.70****$	

^aNumber of episodes when the child directed attention to the prohibited toys in the Don't context with the mother.

** $p < .025$; *** $p < .01$; **** $p < .001$; ⁺ $p < .10$.

controlled for the overall number of episodes in which they turned their attention to the toys while with their mothers ($M = 43.85$, $SD = 11.19$).

The first regression predicted the internalization composite in the Do context and the second predicted the internalization composite in the Don't context (see Table 8). Child gender and, in the second regression, the number of segments in which the child was interested in the prohibited toys, were entered at Step 1. The Do and Don't committed and situational compliance composites and the maternal power composite were entered at Step 2.

The regressions clearly portrayed the strong positive links between committed compliance with mother and internalization of her rules; the only significant prediction from situational compliance was negative. Moreover, these links were quite unique to the context of self-regulation (Do versus Don't) and did not hold across the contexts. The only predictor of internalization in the Do context (the composite across 33 and 45 months) was committed compliance in the Do context (the composite across all four assessments). The only positive predictor of internalization in the Don't context (the composite across all four assess-

ments) was committed compliance in the Don't context (the composite across all four assessments). Additionally, the composite of situational compliance in the Don't context was a significant *negative* predictor of internalization with prohibited toys.

The inclusion of the composite of maternal power across the four assessments did not diminish those links. The maternal power composite did not contribute uniquely to the prediction of internalization, with the compliance composites also entered into the equation. These regressions were also conducted with the interactions between each of the committed and situational compliance scores and child gender included. No interaction was significant, and the other relations were unchanged.

Links between Committed Compliance with Mother and Cooperation with Another Adult

The correlations between children's committed compliance with their mothers and their cooperation with the experimenter yielded one modest significant relation in the predicted direction. At 33 months, high committed compliance with mother correlated with

concurrent high cooperation with the experimenter, $r(104) = .23$, $p < .025$. When children's fearfulness was partialled out, the correlation remained unchanged, $rs(101) = .24$ and $.22$, $ps < .025$, controlling for observed and mother-reported fear, respectively.

DISCUSSION

To our knowledge, this is the largest existing observational data set on the development of children's early compliance with their caregivers. We applied our conceptual model of heterogeneity within compliance—which proposed two forms of compliance, committed and situational (Kochanska & Aksan, 1995)—the entire period that is considered critical for the emergence of self-regulatory capacities, that is, from late infancy through preschool age. Simultaneously, we explored two demand contexts, the Do context, in which the caregiver requests that the child sustain an unpleasant, tedious activity, and the Don't context, in which the caregiver requires that the child suppress a pleasant, attractive activity.¹ Additionally, self-regulation was considered more broadly by the inclusion of internalization paradigms that “isomorphic” to compliance in that they require sustaining or suppressing an activity, but without external control.

This study makes several contributions to the field. First, it provides a comprehensive description of developmental effects (both change and stability) and gender effects for both forms of compliance. Second, it describes the differences between the two demand contexts, and elucidates one potential source—temperamental fearfulness—as differentially underpinning Do versus Don't committed compliance. Third, it examines the links between committed and situational compliance, replicating, but also considerably extending our past work by showing the specificity of those links for the Do and Don't demand contexts. Here, these links are considered in more depth, and the role of maternal discipline as a possible third variable is examined. Fourth, we ask whether committed compliance is specific to the particular relationship between the child and the caregiver, or whether it generalizes to other social partners.

¹The anonymous reviewers accurately pointed out that Don't contexts encompass refraining from performing a new activity and ceasing an already ongoing activity. In this study, both were included (the mothers issued the prohibition before the child touched the toys, and asked the child to stop the activity whenever the child was touching them), but they were not analyzed separately. There was also a difference between the Do and Don't internalization contexts in that the former was a continuation of an ongoing activity with the mother, whereas the latter was not.

Developmental and Gender Effects in the Two Forms of Compliance

In terms of the total scores, committed compliance was a much more frequent form of children's response to maternal discipline than was situational compliance. Committed compliance showed an upward trend from 14 to 33 months of age, with the greatest gain occurring in the second year of life, from 27% at 14 months to 50% at 22 months. There was also a modest gain from 22 to 33 months, at which time it leveled off at 56%. Situational compliance at first paralleled committed compliance and also increased, albeit much more modestly, from 12% at 14 months to 18% at 22 months. This was its highest point. Thus, very early on, prior to age 2, when self-regulation begins to emerge, even the less mature form of compliance can be viewed as a developmental achievement, because it also reflects at least some willingness to cooperate with the parent (noncompliance was not considered in this study because it is a generally less self-regulated behavior, indicating the absence of the child's willingness or ability to cooperate).

The findings on gender differences were consistent with those of past work (Kochanska & Aksan, 1995) and with the existing large body of evidence suggesting that females' ability or willingness to self-regulate exceeds that of males (although Bjorklund & Kipp, 1996, recently suggested that these effects may be mostly for social and behavioral, and not cognitive, tasks). We again found that girls were more capable of or willing to engage in highly self-regulated behavior. The gender differences for committed compliance remained significant in additional MANOVAs, in which the committed compliance scores were the dependent variables, gender was the between-subjects factor, and temperament measures—fear at 22 and 33 months, and effortful control at 22, 33, and 45 months—were the covariates.

The Role of Demand Context in the Development of the Two Forms of Compliance

The early developmental trajectories of committed and situational compliance were quite distinct in the two demand contexts. The current data provide further impressive evidence of substantial differences between the Do and Don't contexts for the early development of self-regulation. Throughout the studied period, the Do context, which requires the sustaining of a tedious and aversive action, obviously posed a greater regulatory challenge to young children than did the Don't context, which required refraining from an attractive activity. This was reflected in the devel-

opmental trajectories and in the means of the two forms of compliance at any age. In the Do context, both the more mature (i.e., committed) and the less mature (i.e., situational) forms of compliance increased at a relatively similar, modest rate, from 14% at 14 months to around 30% at 45 months. In contrast, developmental changes in the Don't context were drastically different and reflected a much more rapid and dramatic growth of self-regulation. In the Don't context, at all ages, committed compliance was the most prominent behavior, already high (40%) at 14 months and rising to 85% at 45 months, with significant gains at every assessment time. Situational compliance, already low at 14 months (9%), dropped to 4% by the time children were 33 months of age.

Complementing this picture of the divergence and relative separateness of the two demand contexts are the findings on contemporaneous and longitudinal links within and across the contexts for individual children. It appeared that, by and large, at any given time of assessment and for either form of compliance, compliance in one demand context was not predictive of compliance in the other demand context. Similarly, longitudinal stability for individual children was quite clearly present within the same context, whether Do or Don't, for both forms of compliance, but this was not the case across contexts.

Why are the Do and Don't contexts so different and so separate in terms of their regulatory challenges? This issue, as simple as it seems, nevertheless continues to need a developmentally satisfying interpretation. One possible explanation is grounded in the ecology of development: parents enforce prohibitions earlier than requests (Gralinski & Kopp, 1993). Another possibility is that sustaining an activity requires the child to simultaneously execute and coordinate more behavioral elements (Thelen & Ulrich, 1991) than does suppressing an activity. The latter can be accomplished, for example, by an effective distraction.

Another explanation, explored in the present study, is that committed compliance in the Do and Don't contexts may be differently underpinned by children's temperament. As expected, and consistent with several bodies of work on fear (Rothbart & Bates, 1998), the behavioral inhibition system (Fowles, 1994), passive avoidance learning (Mowrer, 1960), and psychopathy (Fowles, 1988, 1994; Lykken, 1957; Quay, 1993), the more fearful children were indeed more able to suppress prohibited behavior or display committed compliance in the Don't context. They were, however, not more likely to show committed compliance while sustaining a tedious, unpleasant activity in the Do context.

It should be noted that for observed fearfulness these fearfulness-compliance links were obtained for

the measures at 22 and 33 months, but not at 14 or 45 months. Perhaps this was due to a greater robustness of the 22- and 33-month fearfulness measures. At these assessments, there were two different paradigms at the two different sessions, in contrast to the 14- and 45-month assessments, during which there was only one paradigm.

Although it was expected that effortful control would be linked to committed compliance in both the Do and Don't contexts, this hypothesis was only partially confirmed. Consistent with the view that effortful control is an important underpinning of self-regulated behavior (Kochanska, 1993; Kochanska et al., 1997; Rothbart et al., 2000; Rothbart & Bates, 1998), this factor was strongly associated with committed compliance in the Don't context. Surprisingly, however, there were only two modest links with Do context committed compliance. This may have been due to the fact that many of the tasks in the effortful control batteries used in this study, as well as many CBQ items, have a strong inhibitory component (to not reach for a reward, to suppress a motion, to slow down). Perhaps tasks involving focused attention would better capture the aspects of effortful control that underpin committed compliance in sustained unpleasant tasks. Indeed, it was shown in a preliminary study that focused attention in infancy predicted committed compliance in the Do context at 14 months (Kochanska, Tjebkes, et al., 1998).

Together, these findings elucidate one possible reason for the absence of correlations between committed compliance scores across the Do and Don't contexts for the individual children, namely, differences in their temperamental individuality. It appears that committed compliance that involves refraining from a pleasant act is more influenced by individual differences in children's inhibitory systems than is committed compliance that involves maintaining an unpleasant activity.

In future work, the study of other dimensions of temperament as underpinning compliance would be useful. For example, Stifter, Spinrad, and Braungart-Rieker (1999) recently reported longitudinal links between infants' inability to regulate their arousal and future noncompliance. Those authors did not study compliance, however. Other relevant temperament dimensions include positive emotionality and approach, or proneness to anger.

It would be interesting to extend our approach to the study of adults' ability to perform socially desirable but unpleasant tasks and their ability to refrain from tempting but prohibited behaviors. Such research may reveal new insights into the function of morality later in life, including links with temperament.

Compliance and Internalization

Throughout the studied age, we obtained range unambiguous support for our view of committed compliance as linked to—and perhaps, in fact, *being*—an early form of the emerging internalization of rules of behavior. As predicted, only committed, and not situational, compliance observed during the interaction with the mother was significantly associated with children's internalization in the absence of surveillance (in fact, situational compliance related negatively to internalization). This supports our originally proposed motivational distinction between the two forms of compliance; that had not previously been differentiated (Kochanska & Aksan, 1995; Kochanska et al., 1995).

Making this distinction allows us to reconcile the opposing views on the role of early compliance in the development of internalization. Committed compliance may indeed constitute the first step in the progress toward internal control, as proposed by some investigators (Gralinski & Kopp, 1993; Lytton, 1980; Stayton et al., 1971). Perhaps committed compliance leads to internalization because it provides a solution for the typical conflict of toddlerhood. That conflict is between two contradictory developmental forces: the wish to comply and the desire to be autonomous. In the case of committed compliance, the toddler embraces the caregiver's agenda, and thus experiences compliance as self-generated and not interfering with striving for autonomy. Ultimately, committed compliance may lead to the voluntary, thoughtful, adaptive, and effective self-regulation described by Kopp (in press). Situational compliance, on the other hand, may reflect more the child's submission to parental influence, and may thus be unrelated to genuine internalization, as argued by Kohlberg (1969). Having now replicated the findings across two independent large samples, we feel increasingly confident that our model accurately portrays this developmental process.

Moreover, in this study, two new issues associated with the links between committed compliance and internalization were addressed. One concerned the specificity of the links between committed compliance and internalization in terms of the demand context. The findings quite clearly indicated that those links are specific to the context, Do versus Don't.

Some limitations of this study that constrain our conclusions should be noted. Although children's behaviors were observed across lengthy naturalistic situations and on multiple occasions, for the sake of clarity of design only one type of task was used for each of the contexts studied: cleaning up toys for the Do context, with and without supervision; and not

touching attractive, easily accessible toys for the Don't context, with and without supervision. Such a clean and complete matrix afforded easy and unambiguous comparisons across sessions and assessments. It also, however, constrained the range of potential self-regulatory challenges. In the future, it would be important to include multiple Do and Don't tasks, perhaps following the taxonomy proposed by Gralinski and Kopp (1993). These might include, for example, sustained chores other than cleaning up, personal conventions (such as saying "thank you" or "please"), refraining from making a mess, or waiting patiently to enjoy an attractive activity. A design with multiple tasks would eliminate the possibility that the specific links found between committed compliance and internalization were context specific only because children may have been more or less interested in the particular task (cleaning up toys, not touching attractive objects). It should be noted that, at least for the links in the Don't context, the likelihood of this interpretation was greatly reduced by controlling for the child's interest in the prohibited objects (Table 8). There was no analogous way of controlling for those potential effects in the analyses involving the toy cleanup, however. In future work, multiple Do and Don't tasks, with and without maternal control, would be useful.

Another possible limitation involved the order in which measures were assessed. The assessments of internalization followed those of compliance with the mother (continuing to clean up the toys alone after having worked with the mother present; refraining from touching the attractive toys at the end of the session, after having responded to the maternal prohibitions throughout the session). In the future, systematically varying the order in which internalization and compliance measures are examined may yield new information.

Another new direction examined with respect to the links between committed compliance and internalization involved the role of a third variable. Several bodies of research indicate that maternal power-assertive style may be negatively related to both children's willing compliance and their internalization of standards of conduct (Grusec & Goodnow, 1994; Hoffman, 1983; Maccoby & Martin, 1983), and that those relations may be bidirectional (Bell, 1968; Patterson, 1997), evolving complexly over time. In the present study, this issue was explored in a preliminary and global fashion, with the goal of testing whether the links between committed compliance and internalization would remain significant if maternal use of power was also entered into the equation. They indeed continued to be significant (see Table 8).

In future investigations, it will be important to move beyond the global model examined here. It is possible that more complex causal analyses would better demonstrate the mutual intricate relations among children's committed compliance, maternal use of power, and internalization. For example, early committed compliance may lead to future lower maternal use of power, which in turn may lead to the child's future higher committed compliance and, ultimately, to better internalization of standards. Thus, there may be multiple mediating effects that may have been obscured by using the global constructs.

Generalization of Committed Compliance

The final goal was to make the first step toward understanding the implications of children's committed compliance in the relationship with their mothers for their functioning in a broader social network. We examined whether a child's committed compliance in the relationship with the mother—which indicates a mature, willing, eager stance toward maternal socialization and influence—promotes the formation of a similar cooperative stance toward other adults, or whether it is unique to the mother–child relationship.

There was one significant, albeit modest, link between committed compliance with mother and cooperation with another adult at the 33-month assessment. Better chosen measures of cooperation with another adult than those available in the present study may have revealed stronger relations. It is also possible that committed compliance may be after all, unique to a given parent–child relationship. Although modest, this relation, if replicated, may be important. Because it is often implicitly assumed that early self-regulation in the family context serves general goals of socialization and fosters broadly conceived social competence (Kopp, 1982; Patterson, 1997), this issue warrants more research.

The early growth of self-regulation and the gradual transition from externally to internally guided conduct are among the perennial and central issues of development. This study contributes to the growing understanding of some of the complexities involved in these issues.

ACKNOWLEDGMENTS

This work was supported by National Science Foundation grants DBS-9209559 and SBR-9510863, an Independent Scientist Award from the National Institutes of Mental Health (KO2 MH01446-01), and the University of Iowa Faculty Scholar Award to the first

author. The authors appreciate the contributions of many students and staff who helped with data collection and coding. In particular, the authors thank Carrie Barnes, Beth Collison, Amy Conner, David Forman, Jami Gross, Elena Harlan, Danise Jones, Beth Lehrman, Jean Leitheiser, Jackie Lund, Kate Nichols, Kirsten Redalen, Joy Russell, Tracy Shaw, Chieko Shikata, Terri Tjebkes, Jenny Vahle, and Tina Wiseman. Thanks also go to all parents and children in the Parent–Child Study for their enthusiastic commitment.

ADDRESSES AND AFFILIATIONS

Corresponding author: Grazyna Kochanska, Department of Psychology, University of Iowa, 11 Seashore Hall E, Iowa City, IA 52242-1407; e-mail: grazyna-kochanska@uiowa.edu. Katherine C. Coy is also at the University of Iowa; Kathleen T. Murray is at the University of Arkansas, Fayetteville.

REFERENCES

- Asendorpf, J. B., & Nunner-Winkler, G. (1992). Children's moral motive strength and temperamental inhibition reduce their egoistic behavior in real moral conflicts. *Child Development, 63*, 1223–1235.
- Bell, R. Q. (1968). A reinterpretation of the direction of effects in studies of socialization. *Psychological Reviews, 75*, 81–95.
- Bjorklund, D. F., & Kipp, K. (1996). Parental investment theory and gender differences in the evolution of inhibition mechanisms. *Psychological Bulletin, 120*, 163–188.
- Bugental, D. B., & Goodnow, J. J. (1998). Socialization processes. In N. Eisenberg (Ed.), W. Damon (Series Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 389–462). New York: Wiley.
- Crockenberg, S. (1991, April). *Conceptual issues in the study of child compliance, noncompliance, and parental control*. Paper presented at the biennial meeting of the Society for Research in Child Development, Seattle, WA.
- Crockenberg, S., & Litman, C. (1990). Autonomy as competence in 2-year-olds: Maternal correlates of child defiance, compliance, and self-assertion. *Developmental Psychology, 26*, 961–971.
- Dienstbier, R. A. (1984). The role of emotion in moral socialization. In C. Izard, J. Kagan, & R. B. Zajonc (Eds.), *Emotions, cognitions, and behaviors* (pp. 484–513). New York: Cambridge University Press.
- Derryberry, D., & Rothbart, M. K. (1997). Reactive and effortful processes in the organization of temperament. *Development and Psychopathology, 9*, 631–650.
- Emde, R. N., Johnson, W. F., & Easterbrooks, A. (1987). The do's and don'ts of early moral development: Psychoanalytic tradition and current research. In J. Kagan & S. Lamb (Eds.), *The emergence of morality in young children* (pp. 245–276). Chicago: University of Chicago Press.

- Forman, D. R., & Kochanska, G. (2001). Viewing imitation as child responsiveness: A link between teaching and discipline domains of socialization. *Developmental psychology, 37*, 198–206.
- Fowles, D. C. (1988). Psychophysiology and psychopathology: A motivational approach. *Psychophysiology, 25*, 373–391.
- Fowles, D. C. (1994). A motivational theory of psychopathology. In W. Spaulding (Ed.), *Nebraska Symposium on Motivation: Vol. 41. Integrated views of motivation and emotion* (pp. 181–228). Lincoln: University of Nebraska Press.
- Goldsmith, H. H., & Rothbart M. K. (1996). *The Laboratory Temperament Assessment Battery (LAB-TAB): Locomotor Version 3.0. Technical manual*. Department of Psychology, University of Wisconsin, Madison, WI.
- Gralinski, H. J., & Kopp, C. B. (1993). Everyday rules for behavior: Mothers' requests to young children. *Developmental Psychology, 29*, 573–584.
- Gray, J. A. (1982). *The neuropsychology of anxiety*. Oxford, U.K.: Oxford University Press.
- Grusec, J. E., & Goodnow, J. J. (1994). Impact of parental discipline methods on the child's internalization of values: A reconceptualization of the current points of view. *Developmental Psychology, 30*, 4–19.
- Hoffman, M. L. (1983). Affective and cognitive processes in moral internalization. In E. T. Higgins, D. Ruble, & W. Hartup (Eds.), *Social cognition and social development: A sociocultural perspective* (pp. 236–274). New York: Cambridge University Press.
- Kagan, J., Reznik, J. S., & Gibbons, J. (1989). Inhibited and uninhibited types of children. *Child Development, 60*, 838–845.
- Kaler, S. R., & Kopp, C. B. (1990). Compliance and comprehension in very young toddlers. *Child Development, 61*, 1997–2003.
- Klimes-Dougan, B., & Kopp, C. B. (1999). Children's conflict tactics with mothers: A longitudinal investigation of the toddler and preschool years. *Merrill-Palmer Quarterly, 45*, 226–241.
- Kochanska, G. (1993). Toward a synthesis of parental socialization and child temperament in early development of conscience. *Child Development, 64*, 325–347.
- Kochanska, G. (1995). Children's temperament, mothers' discipline, and security of attachment: Multiple pathways to emerging internalization. *Child Development, 66*, 597–615.
- Kochanska, G., & Aksan, N. (1995). Mother-child mutually positive affect, the quality of child compliance to requests and prohibitions, and maternal control as correlates of early internalization. *Child Development, 66*, 236–254.
- Kochanska, G., Aksan, N., & Koenig, A. L. (1995). A longitudinal study of the roots of preschoolers' conscience: Committed compliance and emerging internalization. *Child Development, 66*, 1752–1769.
- Kochanska, G., Coy, K. C., Tjebkes, T. L., & Husarek, S. J. (1998). Individual differences in emotionality in infancy. *Child Development, 69*, 375–390.
- Kochanska, G., DeVet, K., Goldman, M., Murray, K., & Putnam, S. P. (1994). Maternal reports of conscience development and temperament in young children. *Child Development, 65*, 852–868.
- Kochanska, G., Forman, D. R., & Coy, K. C. (1999). Implications of the mother-child relationship in infancy for socialization in the second year of life. *Infant Behavior and Development, 22*, 249–265.
- Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child Development, 68*, 263–277.
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology, 36*, 220–232.
- Kochanska, G., Murray, K., Jacques, T. Y., & Vandegest, K. (1996). Inhibitory control of young children and its role in emerging internalization. *Child Development, 67*, 490–507.
- Kochanska, G., Tjebkes, T. L., & Forman, D. R. (1998). Children's emerging regulation of conduct: Restraint, compliance, and internalization from infancy to the second year. *Child Development, 69*, 1378–1389.
- Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. In D. A. Goslin (Ed.), *Handbook of socialization theory and research* (pp. 347–480). Chicago: Rand McNally.
- Kopp, C. B. (1982). Antecedents of self-regulation: A developmental perspective. *Developmental Psychology, 18*, 199–214.
- Kopp, C. B. (1987). The growth of self-regulation: Caregivers and children. In N. Eisenberg (Ed.), *Contemporary issues in developmental psychology*. New York: Wiley.
- Kopp, C. B. (in press). Self regulation in childhood. In N. Eisenberg (Ed.), N. J. Smelser & P. B. Baltes (Series Eds.), *International encyclopedia of the social and behavioral sciences* (Vol. 3.14, article #134). New York: Pergamon.
- Kuczynski, L., & Kochanska, G. (1990). Development of children's noncompliance strategies from toddlerhood to age 5. *Developmental Psychology, 26*, 398–408.
- Kuczynski, L., Kochanska, G., Radke-Yarrow, M., & Girmius Brown, O. (1987). Developmental interpretation of young children's noncompliance. *Developmental Psychology, 23*, 799–806.
- Lepper, M. R. (1981). Intrinsic and extrinsic motivation in children: Detrimental effects of superfluous social controls. In W. A. Collins (Ed.), *Minnesota Symposia on Child Psychology* (pp. 155–214). Minneapolis: University of Minnesota Press.
- Lykken, D. T. (1957). A study of anxiety in the sociopathic personality. *Journal of Abnormal and Social Psychology, 55*, 6–10.
- Lytton, H. (1980). *Parent-child interaction: The socialization processes observed in twin and singleton families*. New York: Plenum.
- Maccoby, E. E. (1992). The role of parents in the socialization of children: An historical overview. *Developmental Psychology, 28*, 1006–1017.
- Maccoby, E. E., & Martin, J. (1983). Socialization in the context of the family: Parent-child interaction. In E. M.

- Hetherington (Ed.), P. H. Mussen (Series Ed.), *Handbook of child psychology: Vol. 4. Socialization, personality, and social development* (pp. 1–101). New York: Wiley.
- Mowrer, O. H. (1960). *Learning and behavior*. New York: Wiley.
- Myers, G. C. (1922). Infants' inhibition: A genetic study. *Pedagogical Seminary*, 29, 288–295.
- Patterson, G. R. (1997). Performance models for parenting: A social interactional perspective. In J. E. Grusec & L. Kuczynski (Eds.), *Parenting and children's internalization of values* (pp. 193–226). New York: Wiley.
- Piaget, J. (1932). *The moral judgment of the child*. London: Kegan Paul.
- Power, T. G., & Chapieski, M. L. (1986). Childrearing and impulse control in toddlers: A naturalistic investigation. *Developmental Psychology*, 22, 271–275.
- Quay, H. C. (1993). The psychobiology of undersocialized aggressive conduct disorder: A theoretical perspective. *Development and Psychopathology*, 5, 165–180.
- Rothbart, M. K. (1989a). Biological processes in temperament. In G. A. Kohnstamm, J. A. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 77–110). New York: Wiley.
- Rothbart, M. K. (1989b). Temperament and development. In G. A. Kohnstamm, J. A. Bates, & M. K. Rothbart (Eds.), *Temperament in childhood* (pp. 187–247). New York: Wiley.
- Rothbart, M. K., & Ahadi, S. (1994). Temperament and the development of personality. *Journal of Abnormal Psychology*, 103, 55–66.
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology*, 78, 122–135.
- Rothbart, M. K., Ahadi, S., & Hershey, K. (1994). Temperament and social behavior in childhood. *Merrill-Palmer Quarterly*, 40, 21–39.
- Rothbart, M. K., & Bates, J. E. (1998). Temperament. In N. Eisenberg (Ed.), W. Damon (Series Ed.), *Handbook of child psychology: Vol. 3. Social, emotional, and personality development* (5th ed., pp. 105–176). New York: Wiley.
- Rothbart, M. K., Derryberry, D., & Posner, M. I. (1994). A psychobiological approach to the development of temperament. In J. E. Bates & T. D. Wachs (Eds.), *Temperament: Individual differences in biology and behavior* (pp. 83–116). Washington, DC: American Psychological Association.
- Stayton, D. J., Hogan, R., & Ainsworth, M. D. S. (1971). Infant obedience and maternal behavior: The origins of socialization reconsidered. *Child Development*, 42, 1057–1069.
- Stifter, C. A., Spinrad, T. L., & Braungart-Rieker, J. M. (1999). Toward a developmental model of child compliance: The role of emotion regulation in infancy. *Child Development*, 70, 21–32.
- Thelen, E., & Ulrich, B. D. (1991). Hidden skills: A dynamic systems analysis of treadmill stepping during the first year. *Monographs of the Society for Research in Child Development*, 56(1, Serial No. 223).
- Vaughn, B. E., Kopp, C. B., & Krakow, J. B. (1984). The emergence and consolidation of self-control from eighteen to thirty months of age: Normative trends and individual differences. *Child Development*, 55, 990–1004.