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Longitudinal Relations of Children's Effortful Control, Impulsivity, and Negative Emotionality to Their Externalizing, Internalizing, and Co-Occurring Behavior Problems

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Abstract

The purpose of the study was to examine the relations of effortful control (EC), impulsivity, and negative emotionality to at least borderline clinical levels of symptoms and change in maladjustment over four years. Children's ($N = 214$; 77% European American; M age = 73 months) externalizing and internalizing symptoms were rated by parents and teachers at 3 times, 2 years apart (T1, T2, and T3) and were related to children's adult-rated EC, impulsivity, and emotion. In addition, the authors found patterns of change in maladjustment were related to these variables at T3 while controlling for the T1 predictor. Externalizing problems (pure or co-occurring with internalizing problems) were associated with low EC, high impulsivity, and negative emotionality, especially anger, and patterns of change also related to these variables. Internalizing problems were associated with low impulsivity and sadness and somewhat with high anger. Low attentional EC was related to internalizing problems only in regard to change in maladjustment. Change in impulsivity was associated with change in internalizing primarily when controlling for change in externalizing problems.

Keywords

regulation; effortful control; externalizing problems; internalizing problems

In recent years, there has been increasing evidence of concurrent and longitudinal relations between children's temperamental characteristics and their maladjustment (Rothbart & Bates, 2006). However, in most of this research, investigators have not differentiated between effortful components of temperamentally based self-regulation (effortful control) and reactive control-related aspects of temperament (e.g., impulsivity), or among various negative emotions. In addition, investigators often have used continuous measures of internalizing or externalizing problem behavior so findings relevant to borderline or clinical levels of problem behaviors were not examined, and issues pertaining to co-occurring symptoms or comorbidity, as indexed in many studies, were not considered. In the present study, relations of effortful control, impulsivity, anger, and sadness to contemporaneous and future externalizing and

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internalizing problems (co-occurring or pure), as well as to change or stability in maladjustment status, were examined in a 4-year longitudinal study.

Dispositional Regulation, Reactivity, and Maladjustment

Temperament has been defined as “constitutionally based individual differences in reactivity and self-regulation, in the domains of affect, activity, and attention” (Rothbart & Bates, 2006, p. 100). Self-regulation refers to “processes such as effortful control and orienting that function to modulate reactivity” whereas reactivity refers to “the arousability of motor, affective, and sensory response systems” (Rothbart, Ahadi, Hersey, & Fisher, 2001, p. 1395).

Effortful Control, Reactive Behavioral Undercontrol (Reactivity), and Maladjustment

The component of temperament associated with voluntary self-regulation is *effortful control* (EC), defined as “the efficiency of executive attention—including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors” (Rothbart & Bates, 2006, p. 129). Measures of EC often tap attentional control (i.e., the abilities to maintain attentional focus upon task-related channels or to shift one’s focus as needed to deal with task demands) and inhibitory control (the capacity to plan and effortfully suppress inappropriate approach responses under instructions or in novel or uncertain situations; Derryberry & Rothbart, 1988; Kochanska, Murray, & Harlan, 2000; Muris & Ollendick, 2005; Rothbart et al., 2001). Dispositional differences in EC appear to have a substrate in the heritable aspects of temperament (Saudino, 2005), have been observed in the early years of life, and seem to exhibit some stability across childhood (Martel et al., 2007; Murphy, Eisenberg, Fabes, Shepard, & Guthrie, 1999; Pedlow, Sanson, Prior, & Oberklaid, 1993), as well as some change with age, likely due to environmental influences such as socialization (see Eisenberg, Zhou, et al., 2005; Nigg, 2006; Rothbart & Bates, 2006).

EC would be expected to affect maladjustment by contributing to the processing of information, as well as to the modulation of emotion and behavior. For example, the abilities to move attention from negative thoughts and to focus on affectively neutral or positive thoughts and activities seem to be important for cutting off negative emotion and have been linked to low levels of anger, anxiety, and depression (Derryberry & Reed, 2002; Derryberry & Rothbart, 1988; Silk, Steinberg, & Morris, 2003). Moreover, focusing on new stimuli or engaging in a new activity appears to reduce distress (Erber & Tesser, 1992; Harman, Rothbart, & Posner, 1997). The ability to focus attention is also likely to aid in planning behavior (Eronen, Nurmi, & Salmela-Aro, 1997; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 2005), which can be used to cope successfully with stressful situations. Attentional control may be especially important for reducing internalizing symptoms such as sadness and anxiety, as well as the anger that is implicated in reactive (emotionally driven) aggression and defiance. In addition, the ability to effortfully rein in behavioral impulses has obvious implications for precluding externalizing problems (Eisenberg, Fabes, Guthrie, & Reiser, 2000).

Temperamental reactivity includes behavioral and emotional reactivity. Behavioral reactivity includes impulsivity (defined as the speed of response initiation; Rothbart et al., 2001), shyness, and behavioral inhibition (slow or inhibited speed of approach and discomfort dealing with novel stimuli, including people; Kagan & Fox, 2006; Rothbart et al., 2001). Impulsive children appear to be pulled in an unthinking manner by their desires and potential rewards, whereas behaviorally inhibited children tend to be constrained, rigid, and inflexible in novel or stressful contexts. Behavioral reactivity can have an apparent regulatory effect on behavior in that it affects the approach to and the slowing and cessation of behavior. However, Eisenberg and

colleagues (e.g., Eisenberg et al., 2004) and others (Derryberry & Rothbart, 1997; Nigg, 2000; Skinner & Zimmer-Gembeck, 2007) have emphasized the difference between willfully or voluntarily controlled aspects of control (including EC) and aspects of behavioral reactivity (or the lack thereof) that are less voluntary and more reactive. To highlight this distinction, Eisenberg et al. (2004) have labeled impulsivity and behavioral inhibition as aspects of *reactive undercontrol and reactive overcontrol*, respectively; this distinction maps onto Gray's behavioral inhibition and activation systems (Gray & McNaughton, 2000). There is evidence that EC and reactive control, although correlated, are separate constructs. They tend to load on separate factors (Rothbart et al., 2001; also see Kindlon, Mezzacappa, & Earls, 1995; Olson, Schilling, & Bates, 1999) and separate latent constructs and provide some unique prediction of maladjustment (e.g., Eisenberg et al., 2004; Valiente et al., 2003).

EC and reactive control both appear to relate to maladjustment, albeit not always in the same ways or to the same degree. Eisenberg et al. (2001) argued that children prone to externalizing problems would be expected to be low in all or most aspects of EC (e.g., inhibitory or attentional control) and high in impulsivity. Such deficits could account for externalizing children's lack of behavioral control and diminished attentional and sociocognitive functioning (i.e., information processing; Dodge, Coie, & Lynam, 2006). In contrast, children prone to internalizing problems were hypothesized to be low in effortful attentional control (which can be used to modulate emotionality), but not effortful inhibitory control (recall inhibitory control is not the same as behavioral inhibition), and to be very low in impulsivity and prone to reactive overcontrol (i.e., unlikely to be pulled by attractive stimuli in the environment and likely to be involuntarily rigid and constrained). Well-adjusted children were predicted to be high in all types of EC and moderate in levels of reactive control—not overly controlled or highly impulsive, but able to be spontaneous and perhaps even somewhat impulsive when situationally appropriate.

There is mounting evidence that deficits in EC are empirically related to children's externalizing symptoms, concurrently and sometimes across time (e.g., Kochanska & Knaack, 2003; Lengua, 2006; Lengua, West, & Sandler, 1998; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Rydell, Berlin, & Bohlin, 2003; Spinrad et al., 2007). However, investigators seldom have examined whether different aspects of EC relate in the same manner, although Martel et al. (2007) found that deficits in inhibitory control were related to externalizing problems, whereas planning (generally viewed as an aspect of EC) was not. Moreover, measures of impulsivity/reactive undercontrol tend to relate positively to externalizing problems (Eisenberg et al., 2004; Krueger, Caspi, Moffitt, White, & Stouthamer-Loeber, 1996; Lemery, Essex, & Smider, 2002; Martel et al., 2007).

The findings regarding relations of EC to internalizing problems are somewhat more complex. Some investigators have found that EC is inversely related to internalizing problems (Eisenberg et al., 2001, 2007; Lengua, 2006; Muris, 2006; Muris, de Jong, & Engelen, 2004; Oldehinkel et al., 2007; also see Zeman, Shipman, & Suveg, 2002), whereas others have not (Oosterlaan, Logan, & Sergeant, 1998, for inhibitory control; also see Rydell et al., 2003). In a study of preschool children, Murray and Kochanska (2002) found a positive relation between EC and children's internalizing symptoms, although they did not differentiate between EC and impulsivity. With the sample in the present study, Eisenberg, Sadovsky, et al. (2005) found that attentional EC was negatively related to pure internalizing problems from approximately age 5 to age 7, but not 2 years later. Thus, it is important to examine which aspects of EC, if any, are related to children's internalizing problems and whether the relation changes with development. It is also possible that relations of EC with internalizing problems depend on their duration and stability, with more persistent problems being associated with more obvious deficits in EC.

The association between internalizing problems and impulsivity has been infrequently examined. However, early behavioral inhibition (reactive overcontrol) tends to predict the development of internalizing problems (e.g., Biederman et al., 1990). In addition, teacher-reported ego overcontrol versus undercontrol has been associated with teachers' (but not parents' and children's) reports of children's internalizing problems (Huey & Weisz, 1997), whereas teacher-rated impulsivity was negatively related to pure internalizing problems in a sample of young school children in China (Eisenberg et al., 2007). However, some investigators have not found an association between tasks that would be expected to tap impulsivity and children's internalizing problems (Krueger et al., 1996; O'Brien & Frick, 1996) or have found a positive relation between impulsivity and depression when contaminated (i.e., overlapping) items were removed from the scales (Lengua et al., 1998). Martel et al. (2007) reported that observers' ratings of reactive control (overcontrol vs. undercontrol) were negatively related to adults' reports of adolescents' internalizing problems, perhaps because many children with internalizing problems also have externalizing problems (and externalizing is related to high impulsivity).

In the sample in this study, Eisenberg et al. (2001; Eisenberg, Sadovsky, et al., 2005) found an association between children's status as a pure internalizer (without externalizing problems) and low impulsivity from age 4.5 to age 7 and 2 years later. The low impulsivity associated with internalizing problems likely reflects inhibited, rigid behavior (i.e., reactive overcontrol). However, given that EC seems to become a somewhat better predictor of maladjustment with age relative to impulsivity, at least for externalizing problems (Eisenberg et al., 2004; Valiente et al., 2003), it is possible that the relation between impulsivity and internalizing problems declines with age.

Because externalizing and internalizing problems often co-occur, it is useful to examine the relations of EC and impulsivity with behavior problems in sample of children with and without co-occurring problem behaviors. It has been argued that disinhibition may contribute to comorbidity between disorders in the externalizing and internalizing spectrum (Krueger & Markon, 2006). Nonetheless, it is important to know whether deficits in regulation/control characterize externalizing or internalizing problem behaviors when they are pure (not co-occurring) or primarily when co-occurring. For example, children with externalizing symptoms may be prone to impulsivity, but only if they are not high in internalizing symptoms.

Negative Emotionality

Negative emotionality often has been associated with both internalizing and externalizing problems (Lemery et al., 2002; Lengua et al., 1998). It has been argued that personality neuroticism contributes to both types of symptoms, as well as to their co-occurrence (e.g., Khan, Jacobson, Gardner, Prescott, & Kendler, 2005). However, it has been suggested that there is some specificity in the nature of the relation between negative emotionality and maladjustment, such that externalizing problems typically are associated with anger and irritability, whereas internalizing problems are associated with sadness and fear (Rothbart & Bates, 2006).

Anger, Frustration, and Irritability

There is mounting evidence of a relation between anger, frustration, or irritability and externalizing problems (Colder & Stice, 1998; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Lemery et al., 2002; Lengua, 2006; Oldehinkel et al., 2007; Rothbart, Ahadi, & Hershey, 1994; Zeman et al., 2002). Such feelings may motivate externalizing behaviors; moreover, externalizing children, especially if aggressive, may become more angry and hostile over time because they tend to be rejected and victimized by peers (Rubin, Bukowski, & Parker, 2006).

Evidence of an association between anger, frustration, or irritability and internalizing symptoms has also been found (Blumberg & Izard, 1985; Lemery et al., 2002; Lengua, 2006; Oldehinkel et al., 2007; Zeman et al., 2002), although these relations tend to be somewhat weaker than for externalizing problems (Eisenberg et al., 2001; Oldehinkel et al., 2007; Oldehinkel, Hartman, Winter, Veenstra, & Ormel, 2004,) and sometimes this association has not been found (Zahn-Waxler et al., 1994). In the sample in the present study, the association of internalizing problems with anger/frustration appeared to become somewhat stronger across 2 years in early childhood (Eisenberg, Sadovsky, et al., 2005), suggesting it is important to examine this relation across time.

Sadness

Emotions such as sadness are expected to underlie some internalizing problems, and frequently have been related to them (Blumberg & Izard, 1985; Eisenberg et al., 2001; Muris et al., 2004; Zeman et al., 2002). These emotions may predispose children to internalizing symptoms; moreover, the negative experiences that anxious or withdrawn (internalizing) children are likely to encounter may increase their dispositional sadness. In fact, there is typically some overlap in measures of internalizing problems and temperamental sadness, and investigators sometimes remove conceptually overlapping items from one or both scales when they examine relations between these constructs (Eisenberg, Sadovsky, et al., 2005; Lemery et al., 2002; Lengua et al., 1998). Nonetheless, relations between internalizing problems and sadness and related emotions have not always been found, especially when different reporters provided information on the two constructs or when facial expressions were used to assess emotion (Blumberg & Izard, 1985; Keltner, Moffitt, & Stouthamer-Loeber, 1995; Zahn-Waxler et al., 1994). There often may be a discrepancy between children's felt emotions and what they express or what is measured. In addition, social withdrawal, a type of internalizing problem, can occur for multiple reasons, not all of which involve negative emotion (Coplan & Armer, 2007). Moreover, the co-occurrence of externalizing problems might dilute the association between internalizing symptoms and sadness.

There are also conceptual reasons to expect children with externalizing symptoms to be relatively prone to sadness and related emotions. Externalizing children are likely to be rejected by peers, which would be expected to engender sadness and loneliness (Asher, Parkhurst, Hymel, & Williams, 1990). Moreover, they are likely to have difficulties at school (Rubin et al., 2006) and to enact inappropriate behaviors that preclude reaching their goals, which would be expected to elicit sadness (Saarni, Campos, Camras, & Witherington, 2006). For example, Capaldi (1991, 1992) argued that noxious externalizing problems tend to lead to pervasive failures (e.g., in regard to school and peer and familial relationships), which increase children's vulnerability to negative emotionality (depression in that study). Conversely, children who are prone to sadness may display incompetent social behavior, including externalizing behaviors, because they do not have the skills or motivation to behave in more socially skilled ways. Likely due to such multiple factors, sadness has been positively related to externalizing problems (Eisenberg, Sadovsky, et al., 2005; Lemery et al., 2002; Zeman et al., 2002), although often primarily within context or reporter (e.g., Eisenberg et al., 2001). If theorists are correct that children with externalizing problems encounter more social difficulties with age, one would expect the association between externalizing problems and sadness to increase with age and differences in sadness between children with pure internalizing and those with pure externalizing symptoms to be less evident with age.

Relatively few investigators have examined relations of children's negative emotionality with pure internalizing problems, pure externalizing problems, and co-occurring problems, especially in multiple assessments across time. It is possible that sadness is sometimes linked with externalizing problems because many children with externalizing problems also have

internalizing problems. Eisenberg, Sadovsky, et al. (2005) found relations of sadness with both pure internalizing problems and with externalizing problems (co-occurring and pure combined) and that sadness was more common for pure internalizers than for pure externalizers. Eisenberg, Sadovsky, et al. (2005) did not compare children with only co-occurring problems to a control group. Co-occurring problems, but not pure externalizing problems, may be associated with sadness, whereas anger may be linked to externalizing problems regardless of co-occurring internalizing problems. It is important for researchers to more closely study children with co-occurring externalizing and internalizing symptoms and to learn whether relations of one type of these symptoms to EC, impulsivity, and emotion are maintained when controlling for the other type.

The Present Study

In the present longitudinal study, children were assessed three times, 2 years apart (labeled T1 to T3 for Time 1 to Time 3; see Eisenberg, Sadovsky, et al., 2005). We had several goals. First, we examined relations of T3 problem behaviors with individual differences in specific types of emotionality (anger/frustration, sadness), EC (attention shifting/focusing, inhibitory control), and reactive undercontrol (impulsivity). Specifically, we assessed the association of maladjustment at T3 with emotionality and regulation/control (averaged across T1 and T3 to reduce the number of analyses; see Results). We expected to find many of the same relations as we did 2 years prior (Eisenberg et al., 2001; Eisenberg, Sadovsky, et al., 2005), although we hypothesized that the pattern of relations might become somewhat more consistent with age. Thus, externalizing problems (pure or co-occurring), in comparison to control status, were expected to be predicted by low attentional and inhibitory EC and high impulsivity—although co-occurring problems might be linked to smaller deficits than pure externalizing (Stieben et al., 2007)—and by anger and sadness, although relations with the latter might hold only when internalizing and externalizing symptoms co-occurred. In contrast, pure internalizing (vs. control) status was expected to be predicted by low impulsivity and high sadness and anger, but not EC, especially inhibitory control. However, it seemed plausible that the attentional deficits noted at T1 but not at T2 for children with internalizing problems might reappear with increasing age because rumination—which reflects a problem in managing attention and cognitive inflexibility (Davis & Nolen-Hoeksama, 2000)—is associated with depression and other adolescent internalizing problems (Garnefski, Kraaij, & van Etten, 2005; Nolen-Hoeksama, Stice, Wade, & Bohon, 2007). Depressive rumination may be most closely related to the inability to inhibit processing of previously relevant information, whereas angry rumination is more closely associated with difficulties in switching to new information, but not with inhibition of a prior task set (Whitmer & Banich, 2007), although training that affects attentional control also decreases rumination (Chambers, Lo, & Allen, 2008). The ability to willfully shift attention seems particularly relevant to rumination, although effortful attention focusing may assist in resisting the tendency to focus on prior thoughts. In addition, internalizing symptoms, in comparison to externalizing symptoms, were expected to be related to higher EC and perhaps sadness and to lower impulsivity and perhaps anger.

At prior assessments, we did not report any comparisons for children with only co-occurring (both internalizing and externalizing) symptoms (they were combined with children with externalizing problems in analyses). In comparison to control children, we expected these children to have significant difficulties in regard to EC. We were unsure whether they would differ from control children in impulsivity because internalizing children tended to be low in impulsivity at younger ages, whereas externalizing children were high in impulsivity. Moreover, children with co-occurring problems were expected to be quite high in anger and sadness in comparison to control children. In addition, Eisenberg et al. (2001, 2004) did not compare children with solely high levels of externalizing symptoms with control children. Thus, we examined whether similar problems with EC/impulsivity and emotionality were as

evident for this group of children as for children with co-occurring problems (compared with control children).

We also examined whether stability in internalizing or externalizing problems across T1, T2, and T3 was related to T3 EC, impulsivity, or negative emotionality when controlling for T1 levels of the given dispositional characteristic (e.g., attentional EC, sadness). These analyses examined whether change in the aforementioned characteristics was related to change/stability of maladjustment. Researchers have found associations between EC or negative emotionality and parenting (see Belsky, Fish, & Isabella, 1991; Eisenberg, Zhou, et al., 2005; Lengua, 2006), suggesting that socialization as well as heredity shape children's dispositions. In the sample in this study (Eisenberg, Sadovsky, et al., 2005), children who maintained high levels of internalizing or externalizing problem behavior over 2 years, in comparison to those who improved over time, generally were higher in anger and sadness. Children who were consistently low in symptoms tended to be lower in anger than children who moved from control to externalizing or internalizing status (with this pattern being stronger for externalizing problems). Sadness was also associated with an increase in externalizing status or with a stable externalizing status. In addition, reductions in externalizing (but not internalizing) problems or a consistently low externalizing status tended to be related to relatively high EC and low impulsivity, especially as reported by teachers. Thus, change in status in internalizing problems was related to change in negative emotionality but not EC or impulsivity, whereas change in externalizing status tended to be associated with fluctuations in negative emotionality, EC, and impulsivity.

In this follow-up, the children moved into preadolescence or early adolescence, a time when problem behaviors often emerge. In general, we expected a similar pattern of findings when we examined stability versus change in symptoms over 4 (rather than 2) years. However, we hypothesized that prediction of maladjustment from negative emotionality might be even more evident, especially for internalizing children, as they increasingly experience negative social reactions for social withdrawal and their negative countenance. In addition, if EC is increasingly important to emotional and behavioral competence with age, it seemed possible that EC might be associated with change and stability in not only externalizing problems, but also internalizing problems, at T3. For example, children who experience a reduction in terms of internalizing problems might be expected to be higher in EC, especially attentional control, than those who develop more internalizing problems or remain high in internalizing problems. We expected high impulsivity to continue to be associated with sustained or increasing levels of externalizing problems, although it seemed possible that it would become less associated if EC increasingly was used to modulate overt expressions of impulsive tendencies.

We also computed analyses in which we controlled for the pattern of change in internalizing symptoms when examining relations of change/consistency in externalizing symptoms to dispositional variables (and vice versa). In this way, we tried to identify associations that were not due to co-occurrence of symptoms. For example, if findings of an association between change in internalizing symptoms and anger were primarily due to co-occurring of externalizing problems, then these relations should be eliminated when controlling for change in externalizing problems.

Method

Participants

Participants in this study were recruited via schools, newspaper ads, and flyers that were placed at after-school programs and preschools. Prior to being selected to participate in the study, parents completed the Child Behavior Checklist (CBCL; Achenbach, 1991a, 1991b). Achenbach's program was used to compute his "T scores" (see Achenbach, 1991a, 1991b).

All children with T scores of 60 or higher on either internalizing or externalizing problems were chosen for participation (many were above 60 on one scale but not the other). In addition, all children who had T scores below 60 on both the internalizing and externalizing scales were included in the sample and were matched as closely as possible in regard to sex, social class (on the basis of parental education and occupation), age, and race. This process resulted in the recruitment of 214 children with a range of CBCL scores (rather than groups of children). Participants received \$25 at the first assessment and \$30 at the other assessments.

The participants in this report were involved in a 4-year longitudinal study (Eisenberg et al., 2001, 2004; Eisenberg, Sadovsky, et al., 2005). A summary of the sample characteristics can be found in Table 1. At T1, 214 children participated. Some data were available for 193 children at T2 and for 185 children at T3. Twenty-nine children did not have any data at T3, and 58 did not complete the observational tasks at T3 (some of these children's parents or teachers completed questionnaires via the mail). The large majority of those totally lost had moved and could not be located. According to *t* tests, those who did not have any data at T3 were lower in T1 parent- and teacher-reported attentional EC, teacher-rated inhibitory control, and family income, $t(207, 193, 187, 192) = 2.49, 2.95, 2.30, 2.41$, respectively, $ps < .05$. According to chi-square analyses, there were no differences between those who maintained participation and those who were lost to attrition on the basis of the sex of the child; mother-, father-, or teacher-reported problem behavior grouping; or type of household (single parent, two parent, or extended family). Whites appeared somewhat more likely to remain in the study than those of other ethnicities, $\chi^2(5, N = 213) = 13.17, p < .05$. Moreover, the 58 children who did not come to the laboratory at T3 were lower in T1 observed persistence than those who came to the laboratory at T3, $t(210) = -2.96, p < .01$.

Procedures and Measures

Children and their primary parent (usually the mother) completed a battery of tasks and questionnaires at a university laboratory. Some families moved during the study but continued to participate by mail. Consent and assent were obtained at each assessment.

Problem behavior groupings—At T1, T2, and T3, mothers and fathers used the CBCL and teachers used the Teacher Report Form (TRF) to report on children's externalizing and internalizing problem behaviors (Achenbach, 1991a, 1991b). Items were rated 0 (*not true*), 1 (*sometimes true*), and 2 (*very true*). The internalizing scale was used to assess withdrawal, anxiety/depression, and somatic complaints. The externalizing scale was used to assess aggression and delinquency. Alphas for all reporters, at each assessment, ranged from .83 to .87.

We used the Achenbach (1991a, 1991b) program to generate T scores for internalizing and externalizing problems (scores are standardized by sex). Consistent with other research using the CBCL (Calkins, Graziano, & Keane, 2007; Zahn-Waxler et al., 1994) and with Achenbach's (1991b) manual, a T score of 60 was considered the borderline clinical cutoff (Achenbach, 1991a, p. 81, 1991b; a score of 70 is the clinical level). Achenbach's program (which is based on using all the items) was used to calculate the T scores. Children at this score or higher are much more likely to be referred for clinical services than children scoring below this cutoff, and using the borderline level provides better prediction of clinical status than does using the clinical level (i.e., 70; Achenbach, 1991a, 1991b). Scores of 60 and above were used to classify children into one of the four groups. Children with T scores below 60 on both the internalizing and externalizing scales were considered controls (CONT), those with scores above 59 on just the internalizing scale were considered internalizers (INT), those with scores above 59 on only externalizing were considered externalizers (EXT), and those with scores above 59 on both the scales were considered co-occurring (CO). Construction of these groups,

albeit not a perfect procedure (because a small difference in scores might result in designation in a different group), allowed comparison with other studies in which the CBCL was used and made it possible for us to examine children with pure versus co-occurring internalizing and externalizing symptoms.

Measures of regulation and impulsivity—Primary caregiving parents and teachers rated (1 = *extremely untrue of your [this] child*; 7 = *extremely true of your [this] child*) children's attention focusing (9 items for parents and 8 for teachers; e.g., "When drawing or coloring in a book, shows strong concentration"; α s = .74 and .69 at T1 and T3, respectively, for parents and .85 and .81 for teachers), attention shifting (9 items for parents and teachers; e.g., "Can easily shift from one activity to another"; α s = .80 and .83 at T1 and T3 for parents and .86 and .87 for teachers), and inhibitory control (13 items for parents and teachers; e.g., "Can lower his/her voice when asked to do so"; α s = .84 and .85 for parents and .88 and .84 for teachers) using the Child Behavior Questionnaire (CBQ, Rothbart et al., 2001, and an unpublished earlier version of attention shifting scale, M. K. Rothbart, personal communication, 1992). Prior to forming the composite scores, 32 experts in the field rated how much each item reflected temperament versus behavior problems (1 = *much better measure of temperament*; 3 = *not a better measure temperament or symptoms, substantial content for both*; 5 = *much better measure of symptoms than temperament*). Items with a mean score of greater than 3.0 were considered to be contaminated and were eliminated (see Eisenberg et al., 2004). Two of the 11 original attention-shifting items were rated as better measures of maladjustment than temperament and were dropped. No items from the attention-focusing or inhibitory control scales were rated as contaminated. A similar procedure could not be used to eliminate items from the CBCL that might tap temperament because all items are included in Achenbach's program that is used to calculate T scores (see Achenbach, 1991a, 1991b). If we deleted items, our T scores (i.e., groups) would not be comparable to those used by other researchers. Because we wanted to reduce the number of analyses and because reports of attention focusing and attention shifting were related at each assessment, r s for parents (207, 181, and 167) = .37, .47, and .49, respectively, p s < .001 and r s for teachers (193, 178, 154) = .61, .55, and .65, respectively, p s < .001, we averaged attention shifting and focusing and label the result *attention* in subsequent analyses.

We also obtained an observed index of EC at T1 and T3. Persistence was recorded while children completed a puzzle that they could feel but not see. The puzzle was in a clear Plexiglas box with a cloth-covered front that had openings to allow children to reach inside. Children were able to cheat by lifting the cloth or viewing the puzzle through the Plexiglas. The experimenter told each child to "complete the task as fast as you can without looking at the puzzle" and then, before leaving the room, set a timer for 4 min so the child would know how much time was left. Persistence was the time working on the puzzle (vs. not working on it) without cheating divided by the total time spent on the puzzle (interrater r s < .95). This measure loads on latent constructs with adults' reports of EC (Eisenberg et al., 2004; Valiente et al., 2003).

Parents and teachers rated children's impulsivity (e.g., usually rushes into an activity without thinking) on the CBQ (13 items for parents and 12 items for teachers; α s = .81 and .82 for parents and .89 and .75 for teachers). None of the items was dropped due to overlap.

Measures of dispositional emotionality—Parents and teachers used the anger and sadness scales from the CBQ to rate children's negative emotionality (Rothbart et al., 2001). Two items from the anger/frustration scale were rated by experts as measuring problem behaviors more than temperament (Eisenberg et al., 2004) and were thus excluded (resulting in 11 items for parents and 8 for teachers; α s at T1 and T3 = .78 and .76 for parents and .88 and .83 for teachers). Sadness (e.g., "Tends to become sad if plans don't work out") was

assessed with 10 items for parents (α s at T1 and T3 were .64 and .60) and 8 items for teachers (2 items were not used with teachers because they were not appropriate for school; α s = .73 and .70). Three additional items were dropped due to being rated by experts as more indicative of maladjustment.

Results

Ninety percent of participants completed some T2 measures, and some data were available for 86% of participants at T3. To reduce problems associated with listwise and pairwise deletion, we imputed missing values in SPSS using the expectation maximization algorithm after specifying a normal distribution. Little's (1988) missing at random (MCAR) test was not significant, $\chi^2(5368, N = 214) = 5448.97, ns$, which supports the method of imputing data. The following analyses are based on the imputed data. See Table 2 for the number of children in each problem behavior group at T1, T2, and T3 prior to and after we imputed missing values.

Analyses of the relations across reporters for the same construct are presented first, followed by prediction of T3 problem behavior groups from EC, impulsivity, and emotionality, and, finally, prediction of change in maladjustment status from change in the aforementioned predictors (i.e., from a predictor at T3 controlling for the T1 level of the predictor).¹

Relations of Measures Across Reporters

Regulation/control and emotionality—T1 and T3 measures of temperament were used as predictors of maladjustment in the major analyses. At T1, the correlations between mothers' and teachers' reports of children's attention, inhibitory control, or impulsivity ranged from .43 to .52, $ps < .01$. At T1, parents' reports of anger and sadness were related to teachers' report of anger and sadness, $rs(212) = .31$ and $.15, ps < .01$ and $.05$, respectively. T3 parents' reports of children's attention, inhibitory control, and impulsivity were related to teachers' reports of these variables; rs ranged from .36 to .46, $ps < .001$. Parents' reports of sadness, but not anger, were related to teachers' report of the same emotion, $r(212) = -.17, p < .05$, at T3.

¹Using the imputed data, we examined if (a) CONTs were lower in internalizing or externalizing symptoms than groups selected to be high on the given type of symptom, and (b) the pure INTs or EXTs differed from COs on a given type of symptom. At each assessment, we computed three multivariate analyses of variance (for mother-, teacher-, or father-reported groups) with one independent variable (the four groups) and six dependent variables (mother-, father, and teacher-reported internalizing or externalizing symptoms [continuous measures]). All multivariate F s were significant. In all cases when the univariate F was significant, CONTs were lower than INTs, EXTs, or COs in a given type of symptom (so this information is not repeated below).

For mother-rated groups at T1, T2, and T3, all univariate F s were significant ($p < .001$) except for teacher-rated internalizing. According to Newman-Keuls tests ($ps < .05$), at T3 INTs or EXTs did not differ from COs in the type of symptom primary to the pure group except CO was higher in mother-reported internalizing than INT. At T2, the results were the same except CO was higher than EXT in mother-reported externalizing (whereas INT and CO did not differ in internalizing). At T1, the results were the same as T2 except CO was higher than EXT in both mother- and father-reported externalizing symptoms.

For teacher-reported groups at T3, all univariate F s were at $p < .01$ except for mother-reported internalizing, which did not vary across groups. Pure and CO groups did not differ in levels of a given type of symptom except CO was higher than EXT in teacher- and father-reported externalizing. At T2, the results were similar except there were no group differences for either mother- or father-reported internalizing symptoms; EXT was higher than CO in mother-reported externalizing; and CO was higher than the pure groups in both teacher-reported internalizing and externalizing symptoms. At T1, there also were no group differences for mother- and father-reported internalizing and CO was higher than EXT on teacher-reported externalizing symptoms.

For T3 father groups, all univariate analyses were significant, $p < .001$. The pure and CO groups did not differ in the given type of symptom. At T2 and T1, the results were similar except at T2, CO was higher than EXT in mother-reported externalizing. At T1, CO was higher than INT in father-reported internalizing and higher than EXT in father-reported externalizing symptoms.

In additional analyses of variance, we compared the T1 internalizing and externalizing for the four change groups (see Prediction of Longitudinal Group Status later in the article). The four groups differed significantly in internalizing and externalizing for both mothers' and teachers' reports, $ps < .001$. According to Student-Newman-Keuls tests, SEs were highest in mother- and teacher-reported externalizing (M s = 71.21 and 68.66, respectively), followed by IMs (M s = 67.72 and 64.18), Ds (M s = 54.27 and 52.04), and SLs (M s = 49.83 and 47.69), all $ps < .05$. The pattern was the same for mother-reported internalizing (M s = 68.87, 65.78, 54.28, and 50.47); teacher-reported SLs and IMS did not differ significantly (M s = 65.82 and 64.78) but did differ from Ds and SLs, who did not differ from one another (M s = 48.68 and 46.80).

Problem behaviors—Simple *ks* were estimated to examine if the classification of children into the T3 groups (CONT, INT, EXT, CO) was consistent across reporters. Simple *ks* for the relations between mothers' and fathers', mothers' and teachers', and fathers' and teachers' reports of maladjustment were .30, .19, and .25, respectively, $ps < .001$ (analogous findings were very similar at T1 and T2; Eisenberg, Sadovsky, et al., 2005). Simple *ks* were also used to examine the stability of ratings within reporter but across time. Simple *ks* from T1–T2, T1–T3, and T2–T3 were .41, .27, and .42, $ps < .001$, for mothers; .33, .21, and .33, $ps < .001$, for fathers; and .18, .15, and .36, $ps < .001$, for teachers, respectively. Table 3 presents the means and standard deviations of the predictors within the four problem behavior groups.²

Prediction of T3 Problem Behavior Groups from EC, Impulsivity, and Emotionality

Because our groups were based on categorical data, we estimated a series of multinomial logistic regressions to test whether there were differences in regulation or emotionality across the four groups. Odds ratios and confidence intervals are reported. The odds ratio represents the change in the odds that a child is a case (i.e., in the group coded 1 rather than in the group coded 0) corresponding to a 1-unit change in the predictor (Cohen, Cohen, West, & Aiken, 2003) and is often used as a measure of effect size. The number of contrasts was limited to those with the most theoretical relevance to reduce the probability of chance findings and the presentation of results—in our view, those contrasting problem groups with the control group or comparing pure INTs to pure EXTs (i.e., CONT vs. INT, EXT, or CO; INT vs. EXT). First, we set the CONT to be the reference category (this provided three of the four contrasts). Next, we set the INTs to be the reference category to compare INT with EXT (three contrasts were always computed at once, although we used only one in this analysis). We used primary caregiving parents' reports (including mostly mothers but a few fathers) of EC, impulsivity, or emotionality when predicting mother- or teacher-reported problem behavior groups. We used only mothers' report of control or emotionality when predicting problem behavior groups on the basis of fathers' report to ensure that these analyses were across reporters. Only individuals with at least some T3 data were included (and any missing data for these children were imputed).

To reduce the number of analyses, we created composite scores (within-reporter) equal to the average of the T1 and T3 measure of temperament. The average within-reporter correlation for the regulation/impulsivity measures was .53 (ranged from .35 to .72). Parents' and teachers' reports of anger were significantly related within reporter between T1 and T3, $rs(212) = .57$ and .20, $ps < .01$, for parents and teachers, respectively. However, reports from T1 to T3 of sadness were only significantly correlated across time for parents, $rs(212) = .53$ and .01, $p < .01$ and *ns*, for parents and teachers, respectively. In addition, for each measure of temperament except sadness, the pattern of findings for the combined measures was very similar to the pattern found when T1 and T3 measures were used separately. These composites (except for sadness) were used for findings presented in Tables 4 and 5 but not in other analyses.

Prediction of Maladjustment Group from EC and Impulsivity

Results from models predicting T3 problem behavior group status from measures of EC and impulsivity are presented in Table 4. In all models, we entered the first-order effects of sex and the measure of EC or impulsivity. The number of interactions with sex did not substantially exceed chance and are not discussed further. Findings were highly similar when we controlled for T3 age so those findings are not presented.

CONT versus INT—For the measures of EC, 15 analyses (5 T1 predictors [parents' and teachers' reports of attention, inhibitory control, and observed persistence] \times 3 outcomes [group

²Age was related only to T3 observed persistence, $r(184) < .16$, $p < .05$.

status based on mother, father, or teacher report]) resulted in no significant findings. For impulsivity, there were three significant effects out of six models (2 raters of impulsivity \times 3 raters of adjustment outcomes). Mother-, teacher-, and father-rated CONT (vs. INT) status was predicted by higher parent-rated impulsivity.

INT versus EXT—When T3 problems were predicted from measures of EC, 6 of 15 analyses were significant (and an additional analysis was nearly significant). Mother-, father-, and teacher-rated INTs, in comparison to EXTs, were predicted by higher attention and inhibitory control (especially the latter), and often findings were significant across reporters. Impulsivity was clearly related to T3 group status (for five of six effects). INT status was consistently predicted by low impulsivity, and the relations were often across reporters.

CONT versus EXT or CO—In 10 of 15 analyses, CONT (vs. EXT) status was predicted by higher scores on measures of EC. For CONTs vs. COs, in 12 of 15 analyses, CONT (vs. CO) status was predicted by measures of EC. For impulsivity, 5 out of 6 comparisons of CONTs with EXTs and 4 out of 6 comparisons of CONTs with COs were significant (and 2 more analyses were nearly significant for the latter). EXT or CO status was consistently predicted by impulsivity, and there were many across-reporter effects.^{3,4}

Prediction from Measures of Emotionality

CONT versus INT—INT status was predicted by anger in two of six (2 predictors \times 3 reporters of maladjustment) analyses (see Table 5). The same pattern emerged for sadness, but the number of significant effects was smaller at T1 (one of six findings) than at T3 (four of six effects were significant; recall we did not combine T1 and T3 reports of sadness).

INT versus EXT—There was modest evidence that EXT status was predicted by anger (only one effect out of six was significant, and an additional effect was marginal). However, two of six regressions were significant and two more were marginal for T3 sadness. In each case, INT (versus EXT) status was predicted by higher sadness. Thus, INT and EXT were fairly equivalent in their relation with anger whereas INT status was associated with sadness at T3.

CONT versus EXT or CO—For CONT vs. EXT status, three of six effects for anger were significant (an additional effect was nearly significant). For CONT versus CO status, all six effects were significant. Mother-, father-, and teacher-designated EXT or CO status was predicted by high anger. CONT versus EXT status was not predicted by T1 or T3 sadness. However, CO vs. CONT status was predicted by sadness in two of six analyses at T1 and three of six analyses at T3.

Prediction of Longitudinal Group Status

Additional multinomial logistic regressions computed to examine whether the T3 regulation/control or emotion related to continuity (or lack thereof) in children's status (maladjustment was the categorical outcome variable). On the basis of T1, T2, and T3 CBCL or TRF T scores from the externalizing scale (ignoring co-occurring symptoms and, separately by reporter,

³In additional analyses, we compared pure INTs or pure EXTs to COs (COs were compared with CONTs, EXTs, and INTs in three simultaneous contrasts). There was very limited evidence that EXT (vs. CO) status was predicted by attention (one of six analyses), inhibitory control (one of six analyses), or impulsivity (no significant findings). However, INT (vs. CO) status was predicted by higher attention (all six contrasts were significant) and inhibitory control (all six contrasts were significant) and lower impulsivity (five contrasts were significant).

⁴Additional analyses compared pure EXTs or INTs with COs. CO (vs. EXT) status was occasionally predicted by high anger/frustration (one significant and one nearly significant contrast) and sadness (two significant and two nearly significant contrasts). CO vs. INT status was fairly consistently predicted by anger/frustration (four significant contrasts and one marginal contrast) but not sadness. Thus, CO status was predicted somewhat by negative emotionality.

using imputed data for all participants), children were classified into one of five groups. For externalizing problems, children classified as stable lows (SL) had an externalizing T score below 60 at every assessment. Improvers (IM) had an externalizing T score above 59 at T1 or T1 and T2 but had an externalizing T score below 60 at T2 or T2 and T3. Deteriorators (D) had an externalizing T score below 60 at T1 or T1 and T2 but had an externalizing T score above 59 at T2 or T2 and T3. Stable externalizers (SE) had externalizing an T score above 60 at each time, whereas those in the mixed group had externalizing T scores above 59 at T1, below 60 at T2, and above 59 at T3 (or below 60 at T1, above 59 at T2, and below 60 at T3). On the basis of mothers' reports, there were 86 SLs, 11 IMs, 47 Ds, 49 SEs, and 21 mixed. On the basis of teachers' reports, there were 110 SLs, 30 IMs, 32 Ds, 25 SEs, and 17 mixed. The mixed group was not considered because their patterns were heterogeneous. Note that the SLs differed from CONTs in the previous analyses because the former but not the latter could be co-occurring with internalizing problems. Fathers' reports of maladjustment were not analyzed because some of the groups were quite small.

We followed the same rules when creating change groups based on internalizing T scores. On the basis of mothers' reports, there were 67 stable lows (SL), 29 improvers (IM), 41 deteriorators (D), 60 stable internalizers (SI), and 17 mixed. On the basis of teachers' reports, there were 111 SLs, 41 IMs, 24 Ds, 11 SIs, and 27 mixed. Due to the limited sample size in some groups, interactions with sex were not considered, although sex was controlled for in all models. We also controlled for T1 temperament (i.e., the predictor of interest in the given analysis), but we do not present information on T1 temperament to simplify the presentation. Father-reported maladjustment was not used in the analyses because some of the groups were quite small.

In some cases, group status may have been designated because of a fairly small shift upwards or downwards from the cutoff. The percentages of IMs who gained 10 or more points (and mean change) from T1 to T3 were 81% ($M = 14.68$) and 66% ($M = 12.37$) for mothers' reports of externalizing and internalizing and 53% ($M = 10.77$) and 71% (14.95) for teachers' reports of externalizing and internalizing, respectively. Analogous percentages and means for Ds were 55% ($M = -10.18$), 62% ($M = -11.33$), 57% ($M = -13.22$), and 71% ($M = -15.55$). Thus, on average, the degree of change was substantial.

Four contrasts (IM vs. D or SE/SI and SL vs. D or IM) were of primary interest in analyses of either externalizing or internalizing problems. In the first set of analyses, we selected the IMs as the reference category (and controlled for sex). To obtain the SL versus D contrast and the SL versus IM contrast, we set SL as the reference category. Results for externalizing and internalizing problems are summarized in Tables 6 and 7 (bolded for this set of analyses).⁵

In additional analyses, we examined the same contrasts for the four stability/change groups, but we also controlled for stability/change on the other type of problem behavior (as well as T1 level of the predictor variable and sex). Thus, for example, when looking at associations of the pattern of externalizing problems with EC, impulsivity, and negative emotionality, we

⁵To determine whether small differences in T scores would make a substantial difference in the findings presented in Tables 6 and 7, we computed analyses in which we (a) moved children into the EXT group if they had T scores at or above 60 on two assessments and a T score of 59 at the other assessment, (b) removed children from the control group if their average T score across the three assessments was 58 or above, or (c) removed children from the IM group if their T1 T score equaled 60 and the average of the other two T scores was 56 or higher. Children were removed from the D group if their T3 T score was 60 and the average of the other two T scores was 56 or higher. When we performed the analyses presented in Tables 6 and 7 again on the basis of the new groups, only one finding changed from $p < .05$ to $p > .10$. No finding moved from $p > .10$ to $p < .05$. The exact same pattern as this was found when we performed all analyses again on the basis of the original groups, but we removed children from the analyses if they had two T scores equal to 60 and the other T score was equal to 59 (and kept changes b and c previously presented). The percentage of children who were moved or deleted as described in the analyses above was always less than 6% of the sample. Therefore, small changes around a T score of 60 did not substantially influence the findings.

controlled for change in internalizing problems (coded 1 = SLs, 2 = IMs, 3 = Ds, 4 = SIs). The analogous analyses were conducted for internalizing problems controlling for the pattern for externalizing problems. We could not control for co-occurring symptoms by entering dummy codes for the four INT or EXT groups because too few children were in some cells if we crossed internalizing and externalizing group status in the multinomial regressions. New findings based on this method appear in italics in Table 7 and are discussed after the main analyses.

Prediction of Change in Externalizing Problem Status

Stable low versus deteriorators—For the measures of EC, 4 of 10 (5 predictors \times 2 [mother or teacher] outcomes) effects were significant; less than 1 finding would be expected to be significant by chance at $p < .05$. SL (vs. D) status was predicted by T3 attentional control and inhibitory control (controlling for T1 level of the predictor). One of 4 effects was significant for impulsivity, with teacher-rated Ds being predicted by teacher-rated impulsivity; this may be a chance finding. In addition, D status was predicted by anger in 2 of 4 analyses and by sadness in 1 of 4 analyses (perhaps by chance). These findings were all within context (home or school).

SLs versus IMs—There were no significant effects of EC, impulsivity, or sadness for this contrast (although there were four marginal findings in the expected direction). Mother-rated IM (vs. SL) status was predicted by parent- and teacher-rated anger (two of four findings for anger). There was only one marginal finding for sadness.

IMs versus Ds—There were 2 significant findings out of 10 relations for EC. Teacher-rated IM status was predicted by high attentional and inhibitory EC. Teacher-rated D (vs. IM) status was predicted by parent- and teacher-rated impulsivity (2 of 4 analyses for impulsivity). D status also tended to be predicted by anger (1 of 4 analyses) and sadness (2 of 4 analyses). Thus, IM vs. D status was related to somewhat higher EC and less negative emotion and impulsivity at school at T3 when T1 levels of predictors were controlled.

IMs versus SEs—For EC, 3 of 10 findings were significant (and 2 more were near significant). Both mother- and/or teacher-reported IM (vs. SE) status was predicted by high attention and inhibitory control. SE was also predicted by impulsivity (2 of 4 effects were significant), anger (2 of 4 analyses), and sadness (in 2 of 4 analyses), all within reporter. In addition, unexpectedly, mother-designated IM status was predicted by teacher-reported sadness (a finding that disappeared when we controlled for internalizing). Thus, designation as an IM, in comparison to designation of a SE, generally was associated with high regulation and relatively low impulsivity, anger, and sadness.

Change in the pattern of findings due to controlling T1 levels of predictors—In the aforementioned analyses, the T1 and T3 scores for a predictor were both entered in the regressions (recall T1 was a covariate). Often scores on T1 and T3 EC, impulsivity, or emotion were significantly, positively related, and it was possible to have suppression effects with T1 and T3 values of a predictor related in opposite directions to change in maladjustment. Therefore, we examined whether the T1 and T3 predictors (e.g., of impulsivity) of group status were both significant but in different directions. When this occurred, we examined whether the findings in Table 6 or 7 differed if the T1 predictor was not entered in the regression (i.e., whether controlling for the T1 predictor accounted for the significance of the T2 predictor). Relations of T1 and T3 predictors were sometimes significant in the opposite direction, primarily for IMs versus Ds. However, the findings in Table 6 were highly similar when the T1 predictor was not included in the regressions, indicating that the pattern of findings was not due to suppression effects.

Analyses controlling for change in internalizing—Across all predictors except sadness, controlling for INT status in the analyses of change in EXT status had little effect on the findings. However, for sadness, two significant findings dropped to nonsignificance for the IM versus SE contrast (see Table 6). SE status was related to sadness in only one comparison when change in internalizing status was controlled, likely because many SE children also had internalizing problems and their sadness was linked to internalizing problems (note that the unexpected finding that IM versus SE status was predicted by higher sadness became nonsignificant).

Prediction of Internalizing Problems From Measures of Regulation and Emotionality

Analyses analogous were computed for change in internalizing problems (see Table 7).

SLs versus Ds—For the measures of EC, 3 of 10 analyses were significant: Teacher-reported SL versus D status was predicted by higher attention, inhibitory control, and observed persistence. In addition, teacher-rated SL status was predicted by high parent-rated impulsivity (in 1 of 4 analyses; note that findings in nonbold italicized typeface in Table 7 were not significant in this set of analyses). Finally, SL status was predicted by lower teacher-reported anger (1 of 4 analyses) and sadness (2 of 4 analyses). Thus, there was a modest tendency for an increase in INT problems over time, in comparison to stably low status, to be predicted by low EC and high negative emotion.

SLs versus IMs—Unexpectedly, mother-rated SL (vs. IM) status was predicted by low parent-reported attention and inhibitory control and observed persistence in 3 of 10 analyses. There were no findings for impulsivity, and only 1 finding (out of possible 8) for negative emotion (and this finding for anger was contrary to expectation). However, as indicated in Table 7 with footnotes, the findings for parent-reported attention, inhibitory control, and anger were due to the predictor (temperament) relating to change in maladjustment in reversed directions at T1 and T3; these T3 relations were no longer significant when the T1 predictor was not used as a covariate. Thus, it appears that those three findings were suppression effects.

IMs versus Ds—Three of 10 effects for the measures of EC were significant, and all indicated that EC predicted IM rather than D status. There were no significant effects for impulsivity, but 2 of 4 effects each for anger and sadness were significant. Anger and sadness predicted D rather than IM status within context. In one case (a finding for anger), the T1 and T3 predictors related in opposite directions and the finding for T3 dropped to nonsignificance when the T1 level of the predictor was not included in the regression.

IMs versus SIs—Mother-designated IM (vs. SI) status was predicted by high parent-reported attention but low parent-reported inhibitory control. However, the latter effect was not significant when T1 inhibitory control, which was related in the reverse direction, was not included as a covariate. There were no effects for impulsivity, but 2 of 4 effects each were significant for anger and sadness. IM was predicted by low anger and sadness. Thus, IMs and SIs differed primarily in negative emotion and mostly within context.

Analyses controlling for change in externalizing symptoms—When we recomputed the analyses controlling for change in externalizing status, there were no more changes than would be expected by chance except for impulsivity. When controlling for change in externalizing problems, we obtained three new significant findings and three nearly significant finding for impulsivity (see Table 7). Mother-reported SL (vs. D) status was predicted by higher teacher- and parent-reported impulsivity (in addition to a similar relation for parent-reported impulsivity and teacher-reported maladjustment). The difference in prediction by impulsivity of SL versus IM status also became somewhat more evident (there was one significant finding

and one nearly significant finding out of four). Although only nearly significant, it is worth noting that mother-reported IM (vs. SI) was also predicted by higher parent- and teacher-reported impulsivity. In brief, when change in externalizing problems was controlled, impulsivity predicted the group with fewer internalizing problems at T3.

Discussion

The pattern of findings supports the conclusions that there are relations between maladjustment and dispositional control- and emotion-related aspects of temperament, that change in temperament across 4 years is likely related to change in maladjustment, and that in some cases it is important to differentiate between children with pure externalizing or internalizing problems and those with co-occurring problems. In addition, the findings generally support differentiating between reactive overcontrol (impulsivity) and EC.

As was found at younger ages, children who had externalizing problems in mid- to late-elementary school were clearly predicted by deficits in their attentional and inhibitory EC, as well as their high impulsivity, when compared with control children and especially children with pure internalizing problems. This pattern of association of externalizing with high impulsivity was fairly strong and was somewhat more evident in regard to pure externalizing (EXT) than co-occurring externalizing (CO) problems. Such a pattern would be expected if children with internalizing problems are often overcontrolled rather than impulsive: Their overcontrol might counter their impulsive tendencies. The findings are also consistent with Stieben et al.'s (2007) suggestion, based on electroencephalography (EEG) findings, that children with co-occurring problems have a more anxious regulatory style than children with solely externalizing problems. Thus, for children with co-occurring internalizing and externalizing problems, the more inhibited pattern of responding that is characteristic of internalizing children may partly buffer children from the problematic behavioral tendencies associated with externalizing problems.

Moreover, when we examined the relations of stability/change in externalizing problems with T3 EC and impulsivity (controlling for T1 levels of EC or impulsivity so that change in patterns could be examined), patterns that were consistent with expectations were found. Movement from nonexternalizing to externalizing status over time (deteriorating; D), compared with stable low externalizing (SL) status, was predicted by low EC and somewhat high impulsivity; this might be partly due to Ds being higher than SLs in externalizing at T1. Although children who moved from an externalizing to low externalizing status (IMs) did not differ from children who were never high in externalizing problems in these analyses (when T1 levels of temperamental predictors were controlled), IM versus D or stably high externalizing (SE) status was predicted by high EC and low impulsivity. When we controlled for change in internalizing status, this general pattern of findings for EC was still evident. Thus, children who improved in regard to EXT problems, as well as children who never experienced them, appeared to be relatively high in EC and low in impulsivity at T3 even when we controlled for T1 levels of these variables. These findings are consistent with the notion that change in individual differences in temperamentally based characteristics might contribute to the emergence of externalizing problems, although the data cannot prove causal relations. In any case, the relation between EC and externalizing problems, although apparently established fairly early, appears to further consolidate with age.

Improvement in externalizing problems, compared with stable low levels of externalizing problems, was not predicted by T3 EC or impulsivity when T1 levels of these characteristics were controlled (there were some near significant findings). To determine whether this pattern was due to controlling for T1 levels of variables, we conducted supplemental analyses in which pattern of change in maladjustment was related to T3 EC or impulsivity without controlling

for T1 levels of the latter variables. We found that consistently low versus improving externalizing status was related to higher attentional EC (in two of four analyses, with one more being near significant) and inhibitory control (all four analyses) and lower impulsivity (two of four analyses, with one more being near significant) at T3. We also ascertained that SL versus IM externalizing status was consistently related to high EC (all but one contrast was significant) and low impulsivity (all contrasts were significant) at T1. Thus, improving in comparison to stable control status was still predicted by low regulation and high impulsivity at T3, but when the two groups' starting point at T1 was taken into account, they apparently moved as much in a positive direction.

The aforementioned findings on EC and externalizing problems have implications for parenting and interventions. Our findings support the conclusion that change in EC is related to change in borderline or clinical levels of externalizing problems. Because EC is likely more malleable than impulsivity and modulates the expression of impulsivity, interventions designed to reduce externalizing problems can benefit from attempts to foster EC (for an example, see Riggs, Greenberg, Kusche, & Pentz, 2006). Moreover, executive functioning, which is involved in EC, has been linked with the responsiveness to interventions for school readiness and appears to mediate the effects of interventions on school readiness, including social competence and aggression (Bierman, Nix, Greenburg, Blair, & Domitrovich, 2008). Thus, initial levels of EC may affect the extent of change in EC and, in turn, in related socially competent behavior and aggression.

Our findings were not as straightforward for the relation of EC to internalizing problems. In general, low EC was related to internalizing problems primarily when we examined patterns of change (see Table 7), not direct relations between the constructs (as in Table 5). In the analyses related to change, deficits in attentional control predicted more internalizing problems over time or consistently high levels of internalizing problems. Unexpectedly, EC predicted improvement in, rather than consistently low levels of, internalizing problems, but for the most part, this pattern of findings appeared only when we controlled for T1 EC (which tended to be higher for stably low than for improving children) and may have been a suppression effect. It is noteworthy, however, the pattern for inhibitory control was fairly weak when we controlled for change in externalizing, likely because inhibitory control is associated with externalizing but not with pure internalizing problems (Eisenberg et al., 2001; Eisenberg, Sadovsky, et al., 2005).

Thus, by mid to late childhood, children who improved in terms of internalizing problems showed evidence of being fairly well regulated (somewhat high in EC). In additional analyses, however, we found that high attentional EC and low impulsivity marginally predicted the group that never had internalizing problems versus those who improved at T3 (not controlling T1; in two of four analyses each). There were no differences in inhibitory control or the puzzle task. Stably low internalizing status versus improvement status was predicted by low anger and sadness (in three of four contrasts each). Thus, improvers were children with a temperamental disadvantage (for biological and/or socialization reasons) at a young age (which might account for their somewhat elevated rate of mother-reported internalizing at T1 compared with stable lows; see Footnote 1) that dissipated somewhat with time. Improvers may have been children who were exposed to a more favorable social environment that fostered the development of EC over time or were late bloomers in regard to EC. It will be important in future work to identify factors that account for changes in maladjustment and learn whether changes in dispositional factors contribute to improvements or are merely correlates of change in maladjustment.

The fact that change in EC, especially attentional control, seemed to predict change in internalizing status is interesting given the lack of an association between the two constructs

2 years earlier at T2 (although relations were found at T1). One would expect internalizing problems to be associated with problems in attentional control because the latter is believed to be important in regulating anxiety and the rumination that is linked with depression (Chambers et al., 2008; Nolen-Hoeksama et al., 2007; Whitmer & Banich, 2007). When children are early-elementary-school age or younger, individual differences in the regulation of attention may be easy for adults to identify because the mean level of attentional control is relatively lower (e.g., Murphy et al., 1999), and those with relative deficits are, thus, fairly obvious. Change in EC is not very apparent on many tasks after age 7–10 years (Rueda, Posner, & Rothbart, 2004). Nonetheless, perhaps as children move from childhood into early adolescence, an increase in problems in attentional control signals a susceptibility to the depressive symptoms (e.g., Hankin et al., 1998) and heightened negative emotionality (Larson, Moneta, Richards, & Wilson, 2002) that are more common in adolescence than in childhood. Such negative emotionality often may be due to problems with rumination and attentional self-regulation more generally, including the appropriate use of coping strategies such as cognitive distraction. In addition, older children generally are better able than young children to use attention to cognitively control their behavior and emotion (Eisenberg, Fabes, & Guthrie, 1997); thus, a deficit in this capacity may become a more salient predictor of internalizing problems with age (see Lengua, 2006).

With children about the same age as those in the present study, Stieben et al. (2007) found neurological evidence of problems in attentional control for comorbid as well as pure externalizing children (they did not study pure internalizers). The children in the present study were approximately age 9 to turning 12 at T3; it is important to examine whether the relation of internalizing problems to attentional control deficits is evident in adolescence and whether there are sex differences in this pattern given the greater likelihood of depression for girls (Hankin et al., 1998). Moreover, further work is needed to determine whether patterns of change in attentional EC are more predictive of internalizing problems in late childhood/early adolescence than are mean levels of EC.

Pure internalizing status, in comparison to control, co-occurring status, or especially pure externalizing status (see Footnote 2), was linked with impulsivity. In addition, when change in externalizing problems was taken into account, an increase in internalizing problems over time, in comparison to consistently low internalizing problems, was predicted by low impulsivity, although this association was infrequently found when co-occurrence of symptoms was not taken into account. Thus, very low impulsivity appears to be a harbinger of future internalizing problems for children who have not yet developed them, at least if they are not also high in externalizing problems. Such children likely are inhibited and inflexible in their control and may have difficulty developing adaptive ways to cope with novelty, stress, and negative emotion (see Davis & Nolen-Hoeksama, 2000). Such findings highlight the importance of spontaneity and the lack of overcontrol, likely because children very low in impulsivity (who tend to be behaviorally inhibited; Kagan & Fox, 2006) are less appealing to peers and less likely to approach and learn to cope with diverse situations. Blair and Diamond (2008) argued that self-regulation reflects an emerging balance between emotional arousal and cognitive regulation; children who are very low in impulsivity may lack an optimal level of approach-oriented behavior and positive emotion while being prone to negative emotions such as anxiety and depressive affect.

Unlike at T1 and T2, there were few findings for the behavioral measure of persistence, although the few findings obtained were consistent with the larger pattern of findings. This measure may be a better index of EC at young than at older ages (the average correlations of this measure with teachers' and parents' reports of attention shifting, focusing, and inhibitory control at T1, T2, and T3 were .23, .16, and .12), although it still grouped with measures of EC on a latent factor for children approximately the age in this study (Valiente et al., 2003).

Children's negative emotionality, like their EC, was substantially related to their maladjustment. Children high in anger were prone to pure externalizing and co-occurring problems, especially the latter, although children with internalizing problems were also somewhat prone to anger. Moreover, change in anger was related in predictable ways to change in both internalizing and externalizing problems. Evidence that anger/frustration predicted EXT versus INT status was weak. However, the associations of anger with internalizing and externalizing problems may be due to different processes. The association of internalizing problems with anger appears to develop with age (see Eisenberg, Sadovsky, et al., 2005), perhaps as a reaction to increasing peer rejection or failure to act in accordance with adults' changing expectations (e.g., in regard to being assertive). In contrast, the pattern of association between externalizing problems and anger/frustration is evident from a fairly young age (e.g., Eisenberg et al., 2001; Gilliom et al., 2002), and it is quite possible that intense and/or frequent anger contributes to externalizing problems for some children. If this reasoning is correct, modifications in the social environment may be especially likely to diminish the likelihood of internalizing children developing maladaptive anger.

Both internalizing problems and especially co-occurring problems tended to be linked to sadness, whereas sadness did not predict solely externalizing problems versus control status. Adult-reported sadness sometimes also predicted pure internalizing versus pure externalizing status. Change in sadness was also associated with undesirable patterns of change over time in both internalizing and externalizing symptoms, although the pattern for externalizing was relatively weak when change in internalizing problems was controlled in the analyses. Thus, sadness appeared more closely linked to internalizing than externalizing problems and may differentiate pure internalizing children from those who also have externalizing problems. As children mature, those with pure externalizing problems may be less likely to show sadness and may experience anger more frequently than sadness. Perhaps such children are particularly prone to rumination over angry thoughts (Whitmer & Banich, 2007).

The pattern of findings is consistent with the view that negative emotionality contributes to the co-occurrence of internalizing and externalizing symptoms (Khan et al., 2005). Anger (at T1 and T3 combined) and sadness at T1 were somewhat better predictors of co-occurring group status than pure internalizing or externalizing status. Moreover, deficits in EC but not impulsivity more frequently predicted co-occurring status than pure externalizing (to a modest degree) or pure internalizing (fairly markedly) status. The latter pattern of findings suggests that it is voluntary inhibition, not simply disinhibition, that plays a role in the co-occurrence of internalizing and externalizing spectrum disorders (Krueger & Markon, 2006). Given the apparent role of heredity and to a lesser degree, shared environment, in such comorbidity (e.g., O'Connor, McGuire, Reiss, Hetherington, & Plomin, 1998), it seems reasonable to examine genetic and parenting influences on temperamentally based EC and negative emotionality (see Rothbart & Bates, 2006) as factors that predict or foster comorbidity of externalizing and internalizing disorders.

Relations of maladjustment with negative emotionality often were found within context—that is, when reporters in a given setting provided information on both maladjustment and temperament (although this was less often true for analyses predicting control versus co-occurring status; see Table 5). Such findings are not unusual. For example, Rydell et al. (2003) found that parents' reports of children's fearfulness were related to internalizing problems at home but not at preschool or elementary school. The lack of findings across contexts may be partly because teachers' and parents' reports of negative emotionality generally were not correlated (there was modest agreement on anger at T1). Lack of agreement about children's negative emotionality is a common finding (Goldsmith, Rieser-Danner, & Briggs, 1991; Verhulst & Akkerhuis, 1989) and may be due to differences in teachers' and parents' perspectives, teachers' lesser awareness of children's negative emotions (especially

with age of the child), or differences in the emotions children actually experience or display in different contexts.

Our method of constructing groups was, perhaps, not ideal; one might use latent profile models for a more elegant approach. However, we believe that the construction of groups from such models would have resulted in a somewhat different question than our method of forming groups. For example, both Booth-LaForce and Oxford (2008) and Eggum et al. (in press) found no high stable group of children for adult-reported withdrawal but did identify a group of children who repeatedly scored approximately 1 standard deviation or more above the mean on withdrawal. Booth-LaForce and Oxford (2008) noted that those children included some from both the increasing and the declining classes who remained relatively high in withdrawal despite increasing or decreasing somewhat in level. Both sets of investigators found that the high stable group was associated with dispositional, demographic, and/or family risk factors. Thus, identification of children high in problem behaviors over time (even if declining or increasing somewhat) can provide a somewhat different perspective on the development of adjustment problems than identifying children's trajectories, especially when a high stable group is not identified using other methods.

The findings in this study suggest not only that temperamental regulation/control and negative emotionality are associated with subclinical and clinical maladjustment but also that temperamentally based characteristics can change, and such change may be an important correlate or cause of change in maladjustment. Because temperamental differences are evident before differences in maladjustment, it is likely that temperament contributes more to maladjustment than vice versa, although the effects are probably bidirectional. Socialization and other environmental factors (e.g., familial risk) that have been linked to temperament (e.g., Eisenberg, Zhou, et al., 2005; Evans & English, 2002; Lengua, Honorado, & Bush, 2007) may mediate their association with maladjustment, although over time. However, because initial change groups differed somewhat in their mean levels of maladjustment and temperament at T1, causal relations are unclear. Complex models in which environmental influences, genetics, temperament, and maladjustment are included are needed to sort out the directions of effects.

Overall, the findings support the conceptual distinction between EC and reactive undercontrol (impulsivity). For example, impulsivity but not EC tended to differentiate the internalizing group from the control group at T3, whereas EC was a more consistent predictor than impulsivity of change in externalizing problems. Thus, future work may benefit from careful differentiation between more voluntary EC and less voluntary and more reactive behaviors that reflect over- versus undercontrol. Such work is important because it is possible that EC is more malleable (because it is voluntary) than is reactive control and a better target for intervention.

In summary, the findings in this study are consistent with the view that children's dispositional characteristics contribute to, and are at least associated with, externalizing and internalizing problems. In addition, the findings indicate that it is useful to differentiate between EC and impulsivity and to consider whether externalizing and internalizing symptoms are co-occurring. Strengths of this study include its longitudinal and multireporter design. Weaknesses include the use of few behavioral measures of the predictors, the use of a sample of convenience, and the fact that it is impossible to conduct a strong test of causality with correlational data. Moreover, because unregulated children tended to be those who dropped out of the study, the results may be somewhat biased. The findings obtained also may not generalize to children from high-risk families and neighborhoods and children from some minority groups or cultures.

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Table 1

Sample Characteristics

Variable	T1		T2		T3	
	No. or mean	SD	No. or mean	SD	No. or mean	SD
Sex						
Boys	118		105		103	
Girls	96		88		82	
Age in months	73.48	9.40	91.92	9.96	116.88	11.1
Ethnicity ^a						
Native American	10		6		5	
African American	7		7		7	
Hispanic	26		24		22	
Asian	1		1		1	
White	163		149		145	
Other	7		6		5	
Income per annum (in dollars) ^b	43,000	26,000	40,000–60,000	2.96	60,000–80,000	3.40
Mothers' education (in years) ^c	14.11	2.49	3.80	1.37	3.86	1.42
Fathers' education (in years) ^c	14.06	3.05	3.84	1.59	3.82	1.62
Mothers	209		192		174	
Fathers	116		115		95	
Teachers	194		180		163	

^aThe first language in the homes was not assessed.

^bAt T1, participants responded to an open-ended question regarding their income, but at T2 and T3, participants selected their income from a 5-point scale (1 = less than \$20,000 per year, 2 = \$20,000–\$40,000 per year, 3 = \$40,000–\$60,000 per year, 4 = \$60,000–\$80,000 per year, 5 = \$80,000–\$100,000 per year, and 6 = greater than \$100,000 per year).

^cAt T1 participants wrote the number of years of education, but at T2 and T3 participants selected from a 5-point scale (1 = less than high school or equivalent, 2 = high school or equivalent, 3 = some college, not yet graduated, 4 = 2-year college degree or trade school, 5 = college degree, or 6 = professional degree).

Table 2

Frequencies of Problem Behavior Groups

Reporter	Total No.	Control			Internalizing			Externalizing			Co-occurring		
		Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	Boys
Mother	214	73	36	37	35	13	22	30	18	12	76	29	47
Father	214	112	45	67	24	17	7	36	17	19	42	17	25
Teacher	214	126	61	65	26	12	14	41	14	27	21	9	12
Mother	214 (193)	96 (85)	44 (39)	52 (46)	36 (33)	14 (13)	22 (20)	23 (22)	11 (11)	12 (11)	59 (53)	27 (25)	32 (28)
Father	214 (193)	135 (119)	61 (54)	74 (65)	36 (33)	16 (15)	20 (18)	19 (18)	8 (8)	11 (10)	24 (23)	11 (11)	13 (12)
Teacher	214 (193)	119 (102)	55 (48)	64 (54)	26 (26)	14 (14)	12 (12)	37 (36)	15 (15)	22 (21)	32 (29)	12 (11)	20 (18)
Mother	214 (186)	98 (87)	49 (43)	49 (44)	46 (37)	20 (16)	26 (21)	17 (16)	8 (7)	9 (9)	53 (46)	19 (17)	34 (29)
Father	214 (186)	131 (116)	63 (55)	68 (61)	39 (30)	15 (11)	24 (19)	13 (11)	4 (3)	9 (8)	31 (29)	14 (14)	17 (15)
Teacher	214 (186)	116 (101)	51 (42)	65 (59)	38 (32)	22 (19)	16 (13)	34 (30)	12 (11)	22 (19)	26 (23)	11 (11)	15 (12)

Note. Numbers above the parentheses are based on imputed data. The numbers within the parentheses are also based on the imputed data, but we selected only children who had some data at Time 2 (for T2 numbers) or Time 3 (for T3 numbers).

Table 3

Means and Standard Deviations (in Parentheses) for Measures of Temperament Within Problem Behavior Group at Time 3 Assessment

Variable	Mother/parent						Teacher					
	CONT	INT	EXT	CO	CONT	INT	EXT	CO	CONT	INT	EXT	CO
Time 1 variable												
Regulation/impulsivity												
Attention												
Mother report	4.62 (0.65)	4.41 (0.63)	4.17 (0.72)	4.01 (0.70)	4.43 (0.68)	4.53 (0.63)	3.67 (0.62)	4.25 (0.67)	4.49 (0.72)	4.51 (0.76)	4.08 (0.62)	4.07 (0.70)
Teacher report	5.35 (0.87)	4.97 (0.93)	4.50 (0.97)	4.22 (0.95)	5.04 (0.94)	5.30 (1.16)	4.58 (0.68)	4.43 (1.04)	5.02 (0.97)	5.39 (0.97)	4.73 (0.81)	4.04 (0.99)
Inhibitory control												
Mother report	4.91 (0.73)	4.75 (0.73)	4.34 (0.93)	4.14 (1.00)	4.81 (0.79)	5.04 (0.89)	3.67 (0.95)	4.36 (0.97)	4.67 (0.91)	4.89 (0.90)	4.50 (0.83)	4.36 (0.82)
Teacher report	5.53 (0.84)	5.07 (1.01)	4.89 (1.18)	4.38 (1.03)	5.31 (0.95)	5.78 (0.97)	4.89 (1.16)	4.52 (1.31)	5.22 (1.00)	5.55 (0.95)	4.83 (0.82)	4.35 (1.24)
Observed persistence												
Impulsivity	0.60 (0.30)	0.55 (0.29)	0.49 (0.32)	0.56 (0.30)	0.60 (0.31)	0.64 (0.35)	0.40 (0.21)	0.72 (0.31)	0.60 (0.29)	0.61 (0.30)	0.48 (0.28)	0.62 (0.33)
Mother report	4.43 (0.82)	4.31 (0.67)	4.89 (0.85)	4.68 (0.91)	4.43 (0.86)	3.93 (0.67)	4.83 (0.44)	4.93 (0.81)	4.41 (0.79)	4.07 (0.86)	4.94 (0.72)	4.94 (0.58)
Teacher report	3.90 (1.07)	3.94 (1.28)	4.26 (0.99)	4.47 (1.11)	3.86 (1.11)	3.13 (0.81)	4.90 (0.50)	4.40 (1.37)	4.00 (1.16)	3.51 (1.18)	4.60 (0.92)	4.43 (1.14)
Emotionality												
Anger												
Mother report	4.55 (0.75)	4.81 (0.85)	5.11 (0.82)	5.27 (0.86)	4.76 (0.82)	4.59 (0.89)	5.72 (0.89)	5.21 (0.92)	4.72 (0.88)	4.77 (0.98)	4.99 (0.88)	5.12 (0.66)
Teacher report	3.41 (1.10)	3.75 (1.23)	4.25 (1.17)	4.27 (1.34)	3.66 (1.16)	3.48 (1.43)	3.70 (1.48)	4.65 (1.41)	3.45 (1.19)	3.68 (1.26)	3.81 (1.20)	4.77 (1.14)
Sadness												
Mother report	4.28 (0.70)	4.60 (0.82)	4.28 (0.84)	4.58 (0.76)	4.40 (0.72)	4.21 (0.68)	4.07 (1.05)	4.65 (0.64)	4.33 (0.71)	4.53 (0.91)	4.42 (0.60)	4.51 (0.71)
Teacher report	3.39 (0.88)	3.52 (0.96)	3.62 (0.91)	3.66 (0.86)	3.69 (0.93)	3.28 (1.24)	2.84 (0.94)	3.89 (0.69)	3.46 (0.85)	3.64 (0.97)	3.16 (0.95)	3.70 (0.95)
Time 3 variables												
Regulation/impulsivity												
Attention												
Mother report	4.86 (0.68)	4.70 (0.65)	4.47 (0.64)	4.12 (0.71)	4.75 (0.70)	4.41 (0.61)	4.30 (0.89)	4.15 (0.78)	4.70 (0.77)	4.70 (0.77)	4.38 (0.71)	4.21 (0.61)
Teacher report	4.94 (0.92)	4.85 (1.06)	4.51 (1.37)	4.42 (1.00)	4.97 (1.04)	5.01 (0.91)	5.34 (0.79)	3.97 (0.92)	5.11 (0.91)	4.94 (0.93)	4.14 (1.04)	3.80 (0.78)
Inhibitory control												
Mother report	5.29 (0.73)	5.27 (0.74)	4.59 (0.72)	4.45 (0.94)	5.20 (0.76)	5.26 (0.72)	3.90 (0.98)	4.33 (0.97)	5.03 (0.92)	5.26 (0.75)	4.76 (0.84)	4.55 (0.91)
Teacher report	5.22 (1.06)	5.42 (1.05)	4.30 (1.28)	4.79 (1.12)	5.34 (1.09)	5.47 (0.96)	5.02 (0.76)	4.13 (1.09)	5.45 (0.85)	5.62 (0.87)	4.17 (1.01)	3.73 (0.91)
Observed persistence												
Impulsivity	0.69 (0.32)	0.72 (0.26)	0.80 (0.25)	0.70 (0.31)	0.73 (0.31)	0.70 (0.25)	0.75 (0.31)	0.72 (0.32)	0.74 (0.30)	0.71 (0.29)	0.64 (0.30)	0.58 (0.39)
Mother report	4.28 (0.79)	3.84 (0.77)	5.01 (0.86)	4.51 (0.89)	4.27 (0.80)	3.53 (0.51)	5.35 (1.31)	4.74 (0.87)	4.32 (0.87)	3.67 (0.81)	4.96 (0.64)	4.66 (0.72)
Teacher report	3.88 (0.76)	3.72 (0.78)	4.45 (0.94)	4.14 (0.85)	3.83 (0.83)	3.51 (0.61)	4.43 (0.98)	4.29 (0.84)	3.76 (0.70)	3.51 (0.51)	4.72 (0.77)	4.49 (0.83)
Emotionality												
Anger												
Mother report	4.01 (0.66)	4.34 (0.86)	4.64 (0.58)	4.83 (0.87)	4.15 (0.72)	4.38 (0.74)	4.83 (0.73)	4.83 (0.87)	4.20 (0.80)	4.35 (0.92)	4.31 (0.90)	4.84 (0.76)
Teacher report	3.50 (1.05)	3.41 (1.16)	3.55 (1.09)	3.71 (1.18)	3.40 (1.13)	3.59 (1.08)	3.47 (1.23)	3.88 (1.45)	2.98 (0.95)	3.56 (0.97)	4.07 (0.60)	5.03 (0.69)
Sadness												
Mother report	3.86 (0.66)	4.33 (0.70)	4.11 (0.44)	4.49 (0.74)	3.95 (0.68)	4.46 (0.54)	3.73 (0.31)	4.33 (0.51)	4.07 (0.77)	4.17 (0.72)	4.02 (0.71)	4.27 (0.59)
Teacher report	3.66 (0.84)	3.64 (0.90)	3.24 (0.79)	3.35 (0.99)	3.55 (0.96)	4.14 (1.22)	3.16 (0.67)	3.36 (0.95)	3.19 (0.83)	4.00 (0.95)	3.38 (0.79)	4.28 (0.59)

Note. T3 = third assessment; CONT = control group; INT = internalizer group; EXT = externalizer group; CO = co-occurring group.

Table 4

Prediction of Group Status From Effortful Control and Impulsivity at Time 3 Assessment

Variable	Control vs. internalizers						Internalizers vs. externalizers						Control vs. co-occurring					
	Contrast			Confidence limits			Contrast			Confidence limits			Upper/Contrast			Confidence limits		
	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper			
Attention Parent report				I > E** (father)	.180.05	0.63	C > E* (mother)	.28	0.11	0.77C > CO** (mother)	.14	0.07	0.31					
				I > E* (teacher)	.460.19	1.06	C > E** (father)	.16	0.05	0.50C > CO** (father)	.43	0.21	0.89					
							C > E* (teacher)	.44	0.22	0.88C > CO** (teacher)	.28	0.12	0.64					
Teacher report				I > E** (teacher)	.270.13	0.58	C > E** (teacher)	.27	0.14	0.50C > CO** (teacher)	.10	0.04	0.23					
							C > E* (mother)	.39	0.19	0.78C > CO** (mother)	.28	0.16	0.47					
									C > CO** (father)	.38	0.22	0.64						
Inhibitory control Parent report				I > E* (mother)	.400.18	0.92	C > E** (mother)	.31	0.14	0.66C > CO** (mother)	.23	0.13	0.42					
				I > E** (father)	.080.03	0.27	C > E** (father)	.10	0.04	0.30C > CO** (father)	.36	0.19	0.67					
									C > CO** (teacher)	.50	0.28	0.90						
Teacher report				I > E** (teacher)	.170.07	0.38	C > E** (teacher)	.20	0.10	0.39C > CO** (teacher)	.08	0.03	0.19					
				I > E* (mother)	.450.22	0.92	C > E** (mother)	.35	0.18	0.69C > CO** (mother)	.35	0.21	0.56					
									C > CO** (father)	.36	0.22	0.60						
Observed persistence Impulsivity Parent report							C > E* (teacher)	.13	0.02	0.71								
				I < E** (mother)	5.300.218	12.9	C < E** (mother)	3.00	1.37	6.59C < CO† (mother)	1.66	1.00	2.77					
				I < E** (father)	13.414.09	44.0	C < E** (father)	5.05	1.80	14.16C < CO† (father)	1.80	0.98	3.31					
Teacher report				I < E** (teacher)	5.862.63	13.1	C < E** (teacher)	2.64	1.42	4.91C < CO** (teacher)	2.44	1.24	4.80					

Note. Reporter for problem behaviors is indicated in parentheses after each comparison. C = Control group; I = pure internalizers group; E = pure externalizers group; CO = co-occurring group. OR = odds ratio. Odds ratios over 1.0 indicate an increase in the likelihood of being in the group in bolded type in the heading, whereas an odds ratio less than 1.0 indicates a decrease in the likelihood of being in the bolded group.

† $p < .10$.

* $p < .05$.

** $p < .01$.

Table 5

Prediction of Group Status at Time 3 Assessment From Negative Emotionality

Variable	Contrast	Control vs. internalizers			Internalizers vs. externalizers			Control vs. externalizers			Control vs. co-occurring			
		OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper	OR	Lower	Upper	
Anger Parent report	C < I* (mother)	2.00	1.09	3.69	I < E† (mother)	2.32	0.89	6.06C < E*** (mother)	4.65	1.86	11.62C < CO*** (mother)	6.62	3.28	13.35
					I < E* (father)	4.12	1.37	14.44C < E*** (father)	4.92	1.78	13.57C < CO*** (father)	2.50	1.30	4.81
Teacher report	C < I** (teacher)	3.10	1.67	5.76				C < E** (teacher)	4.12	2.14	7.94C < CO*** (teacher)	2.74	1.37	5.49
								C < E† (mother)	1.75	0.94	3.25C < CO*** (mother)	27.88	9.93	78.26
Sadness Time 1 assessment Parent report Teacher report	C < I* (mother)	2.06	1.17	3.63							2.23	1.44	3.46	
											2.07	1.29	3.31	
Time 3 assessment Parent report	C < I** (mother)	2.90	1.52	5.54	I > E* (father)	0.29	0.09	0.88			C < CO*** (mother)	2.13	1.25	3.64
		2.27	1.17	4.39							C < CO* (mother)	1.56	1.01	2.40
Teacher report	C < I*** (teacher)	4.36	2.29	8.33	I > E** (teacher)	0.30	0.14	0.62C > E† (mother)	0.58	0.32	C < CO*** (mother)	4.43	2.33	8.43
		1.85	1.13	3.04	I > E† (mother)	0.57	0.29	1.11			C < CO* (father)	2.25	1.17	4.31
					I > E† (father)	0.49	0.22	1.12			1.06C < CO*** (mother)	6.97	3.25	14.95

Note. Reporter for problem behaviors is indicated in parentheses after each comparison. C = control group; I = internalizers group; E = externalizers group; CO = co-occurring group; OR = odds ratio. Odds ratios over 1.0 indicate an increase in the likelihood of being in the group in bolded type in the heading, whereas an odds ratio less than 1.0 indicates a decrease in the likelihood of being in the bolded group.

† $p < .10$.

* $p < .05$.

** $p < .01$.

Predicting Stability of Externalizing Problem Behaviors From Time 1 and Time 3 Measures of Effortful Control/Impulsivity and Emotionality (Time 1 Level of the Predictor Controlled)

Table 6

Variable	Contrast	Stable low (SL) vs. deteriorators (D)				Stable low (SL) vs. improvers (IM)				Improvers (IM) vs. deteriorators (D)				Improvers (IM) vs. stable externalizers (SE)			
		Confidence limits		OR	Confidence limits		OR	Confidence limits		OR	Confidence limits		OR	Confidence limits			
		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		
Attention at T3																	
Parent report	SL > D ^{**} (mother)	4.52	1.43	14.24	0.97	2.00	4.11	0.46	IM > SE [†] (mother)	0.21	0.21	0.46	0.21	0.21	0.46	0.21	1.03
Teacher report	SL > D ^{**} (teacher)	3.96	2.14	7.34	0.98	1.49	2.28	0.38	IM > SE [†] (teacher)	0.13	0.13	0.38	0.13	0.13	0.38	0.13	1.06
Inhibitory control at T3																	
Parent report	SL > D [*] (mother)	3.43	1.25	9.41	0.95	1.91	3.84	0.26	IM > SE [†] (teacher)	0.12	0.12	0.26	0.12	0.12	0.26	0.12	0.56
Teacher report	SL > D ^{**} (teacher)	8.00	3.93	16.29	0.95	1.91	3.84	0.47	IM > SE [*] (mother)	0.23	0.23	0.47	0.23	0.23	0.47	0.23	0.98
Observed persistence																	
Impulsivity at T3																	
Parent report	SL < D ^{**} (teacher)	0.09	0.04	0.22	0.24	0.48	0.94	2.99	IM < D [*] (teacher)	1.27	1.27	2.99	1.27	1.27	2.99	1.27	5.55
Teacher report	SL < D ^{**} (teacher)	0.33	0.12	0.92	0.45	0.65	0.95	9.75	IM < D ^{**} (teacher)	3.57	3.57	9.75	3.57	3.57	9.75	3.57	13.77
Anger at T3																	
Parent report	SL < D [*] (mother)	0.16	0.08	0.31	0.24	0.65	0.95	0.55	IM < D ^{**} (teacher)	4.33	4.33	9.57	4.33	4.33	9.57	4.33	5.30
Teacher report	SL < D ^{**} (teacher)	0.63	0.36	1.08	0.98	1.65	2.77	0.55	IM > D [†] (mother)	0.28	0.28	0.55	0.28	0.28	0.55	0.28	17.16
Sadness at T3																	
Parent report	SL < D [*] (mother)	0.24	0.08	0.74	0.98	1.65	2.77	3.78	IM < D [*] (mother)	1.16	1.16	3.78	1.16	1.16	3.78	1.16	5.07
Teacher report	SL < D [†] (teacher) ^b	0.63	0.36	1.08	0.98	1.65	2.77	2.63	IM < D ^{**} (teacher)	1.32	1.32	2.63	1.32	1.32	2.63	1.32	6.13
									IM > SE [*] (mother) ^d	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.94

Note. Reporter for problem behaviors is indicated in parentheses after each comparison. We generated the results displayed for the T3 effects of either effortful control/impulsivity or emotion while controlling for the analogous T1 effect. There were no findings for observed persistence. Odds ratios (OR) over 1.0 indicate an increase in the likelihood of being in the group in bolded type in the heading, whereas an odds ratio less than 1.0 indicates a decrease in the likelihood of being in the bolded group. SL = stable low group; D = deteriorator group; IM = improver group; SE = stable externalizer group.

^a A significant finding became nonsignificant when we controlled for INT status.

^b A marginal finding became nonsignificant when we controlled for INT status.

[†] $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$.

Table 7

Predicting Stability of Internalizing Problem Behaviors From Time 1 and Time 3 Measures of Effortful Control and Emotionality (Time 1 Level of the Predictor Controlled)

Variable	Contrast	Stable low (SL) vs. deteriorators (D)			Stable low (SL) vs. improvers (IM)			Improvers (IM) vs. deteriorators (D)			Improvers (IM) vs. stable internalizers (SI)		
		OR	Confidence limits		OR	Confidence limits		OR	Confidence limits		OR	Confidence limits	
			Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper
Attention at T3 Parent report													
Teacher report	SL > D^{**} (teacher)	1.70	1.16										
Inhibitory control at T3 Parent report													
Teacher report	SL > D[*] (teacher)	1.49	1.02										
Observed persistence at T3													
Teacher report	SL > D[*] (teacher)	5.79	1.41										
Impulsivity at T3 Parent report													
Teacher report	SL > D^{**} (teacher)	2.75	1.06										
Teacher report	SL > D^{**} (teacher)	2.41	1.27										
Anger at T3 Parent report													
Teacher report	SL < D^{**} (teacher)	0.37	0.23										
Sadness at T3 Parent report													
Teacher report	SL < D[*] (teacher)	0.43	0.19										
Teacher report	SL < D^{**} (teacher)	0.14	0.07										

Note. Reporter for problem behaviors is indicated in parentheses after each comparison. Odds ratios (OR) over 1.0 indicate an increase in the likelihood of being in the group in bolded type in the heading, whereas an odds ratio less than 1.0 indicates a decrease in the likelihood of being in the bolded group. We generated the results displayed for the T3 effects of either effortful control/impulsivity or emotion while controlling for the analogous T1 effect. Findings in italics were evident only when we controlled for EXT status. SL = stable low group; D = deteriorator group; IM = improver group; SI = stable internalizer group.

^aThe T1 relation between the measure of temperament and the contrast was opposite the direction of the T3 effect. When we dropped the T1 measure of temperament, the T3 effect become nonsignificant.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.