

Assessment of Behavioral Control in Gravitation

Definition Behavioral Control in CID proposal:

The ability to control one's emotions, behavior, and impulses and to adapt to rules. It is often termed as self-regulation or effortful control in the literature.

Aim:

CID will study **how environment** (family characteristics, parents and siblings, peers, and broader societal influences including media) **and child characteristics** (genetic makeup, temperament, and pre- and perinatal factors) **affect the development of social competence and behavioral control, skills that are essential** for functioning in society and **for reducing risk of behavioral and emotional problems**. The ultimate goal is reduction in externalizing behavior problems, an increase of social competence, and more adaptive emotional regulation and behavioral control.

Important in choice of "core measure" of Behavioral Control:

1. Fits well with widely used definition/operationalization of behavioral control
2. Clear distinction (as far as possible) with the predictors and consequences of behavioral control;
3. Same or comparable assessment available for entire age range / also suitable for infants;
4. Preferably used in the ongoing longitudinal studies of WP3;
5. Internationally widely used to assess behavioral control / self-regulation;
6. Strong psychometric properties;
7. Feasible to use this measure in all work packages (questionnaire rather than task/observation, short duration);
8. Ecological validity: measure assesses behavior of child in everyday life;
9. Different informant versions available

Proposed measure: Effortful Control subscales from temperament questionnaires (Rothbart)

We propose to assess behavioral control using a series of questionnaires developed by Rothbart and colleagues to assess temperament across childhood and adolescence (e.g. Putnam, Rothbart & Gartstein, 2008; Rothbart, 1981; Rothbart et al., 2001). The questionnaires are based on a widely used and empirically supported model which defines temperament as hierarchical organized, consisting of lower-order traits subsumed under two reactive factors, i.e., negative affectivity and surgency, and a regulatory factor, i.e., effortful control (Putnam, Ellis, & Rothbart, 2001; Rothbart & Bates, 2006). Particularly the regulatory factor, effortful control, is proposed to use in Gravitation as a measure of behavioral control. The factor effortful control emphasizes self-regulatory processes that modulate emotional and behavioral reactivity, and involves attentional focusing/shifting and activational or inhibitory control (see Figure 1).

We think that the two other factors, negative affectivity and surgency, including aspects of *reactive* control are less applicable to the measurement of 'Behavioral Control'. In contrast to *effortful* forms of control, *reactive* forms of control are rather automatic and involuntary, and hence, are less flexible and adaptive (e.g., impulsivity, behavioral inhibition). Only *effortful* forms of control are thought to contribute to regulation (see Eisenberg et al., 2004). Therefore we suggest to use only the factor "Effortful Control" as a core measure of behavioral control.

The series of questionnaires consists of different age-appropriate versions to assess these processes in infancy (IBQ; 3-12 months), in early childhood (ECBQ; 1-3 years), childhood (CBQ; 3-7 years, middle childhood (TMCQ; 7-10 years), early adolescence (EATQ; 9-15 years) and adulthood (ATQ; 15+ years). Due to developmental changes in the construct effortful control, items and subscales belonging to the factor Effortful Control are slightly different between the versions. Further, in the IBQ (infancy version), the factor is labeled Orienting/Regulatory Capacity instead of Effortful Control, since attention in infancy is rather reactive in nature, becoming more effortfully controlled with maturation (Posner & Rothbart, 2007; Ruff & Rothbart, 1996). The Effortful Control factor (short version) consists of around 30 items (depending on age version). The questionnaire is completed by parents in infancy and childhood (IBQ, ECBQ, CBQ), and can be assessed as parent-report as well as child self-report from middle childhood on (TMCQ, EATQ). The Effortful Control Factor of the CBQ, for instance, involves inhibitory control, attentional focusing, perceptual sensitivity, and low intensity pleasure. A sample item (CBQ) of inhibitory control is “Heeft moeite met stil zitten wanneer het moet (bijv. in de bioscoop of bij de kapper)”, and a sample item of attentional focusing is “Is erg geconcentreerd bezig wanneer zij tekent of kleurt”. See appendix 1 for complete subscales and items of the Effortful Control factor of the different age versions.

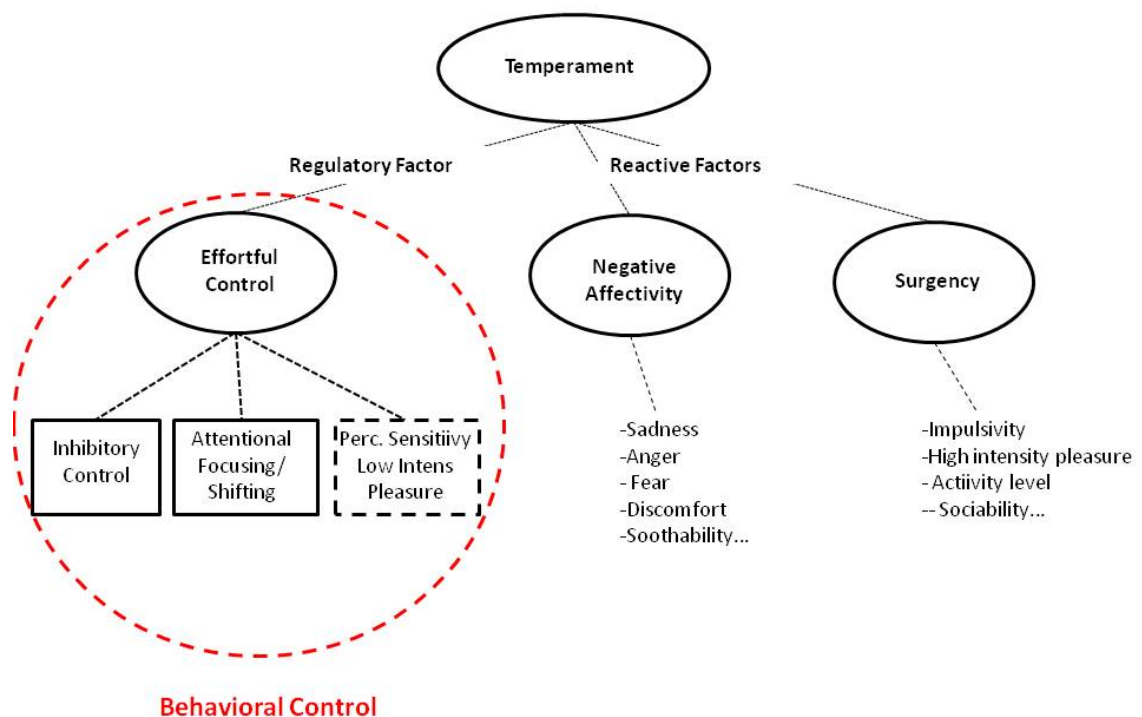


Figure 1: Structure temperament questionnaires, and proposed constructs representing behavioral control

Proposed additional measure: Go/No Go task

In addition, a Go/No Go task may be added to the assessment of behavioral control to include (besides the parent-/child report of effortful control in daily life), an observational measure of inhibitory control. Go/No Go tasks can already be used at preschool age, and are often used (in several different versions) in the developmental as well as neurobiological literature as measures of

children's and adolescents' inhibitory control, i.e. the suppression of a dominant response (e.g. Durston et al., 2006; Kochanska & Knaack, 2003; Simpson & Riggs, 2006). See Appendix 2 for a short description of Go/No Go task. Further information in this document focuses solely on the questionnaire assessment of behavioral control/effortful control. Information on Go/No Go to be added if assessment of this task in Gravitation seems feasible.

Ad. 1 – Fits well with widely used definition/operationalization of behavioral control:

The definition of Behavioral Control as formulated in the CID proposal (ability to control emotions, behavior, impulses and adapt to rules) fits well to what is often called 'Effortful Control' in the literature. The construct effortful control was introduced by Rothbart and colleagues, as a temperament trait emerging at the end of the first year of life, and is defined as *the capacity to inhibit a dominant response and initiate a subdominant response according to situational demand* (e.g. Rothbart, 1989; Rothbart & Bates, 1998; Rothbart & Bates, 2006). Effortful control is a superordinate construct, including attentional control (i.e., the ability to focus or shift attention and persist on tasks) and activation or inhibitory control (i.e., the abilities to activate or inhibit behavior as is necessary to respond adaptively, even – or especially – when one does not want to do so). Effortful control is assumed to be used to modulate emotions, cognitions and behavior.

Conceptually, effortful control can be expected to be related to children's adjustment, because adjustment problems often are defined in terms of problems in the controlling of emotions (e.g. high levels of anger or anxiety) or controlling of behavior (e.g. externalizing problems such as aggression) (Eisenberg et al., 2004).

The operationalization of effortful control as proposed by Rothbart and colleagues is widely used in the international literature on behavioral control / self regulation. For instance, both research of Eisenberg and colleagues (e.g. Eisenberg, Fabes et al., 2000; Eisenberg & Morris, 2002) and of Kochanska (e.g. Kochanska, Murray & Coy, 1997; Kochanska & Knaack, 2003) builds on Rothbart's approach of effortful control. However, Eisenberg and Kochanska mainly focus on inhibitory control and attentional focusing/shifting as essential aspects of the regulation of emotions and behavior (and in their research often only assess these). The other aspects that are part of the Effortful Control Factor (i.e., perceptual sensitivity, low intensity pleasure) are less often used in operationalizations of regulatory control.

Ad 2 - Clear distinction (as far as possible) with the predictors and consequences of behavioral control

"CID will study **how environment** (family characteristics, parents and siblings, peers, and broader societal influences including media) **and child characteristics** (genetic makeup, temperament, and pre- and perinatal factors) **affect the development of social competence and behavioral control, skills that are essential** for functioning in society and **for reducing risk of behavioral and emotional problems**. The ultimate goal is reduction in externalizing behavior problems, an increase of social competence, and more adaptive emotional regulation and behavioral control."

Throughout the CID proposal, social competence and behavioral control are described as potential predictors of problem behavior. To be able to study how behavioral control is related to the development of problem behavior, the two constructs (behavioral control versus problem behavior) need to be distinguished. Therefore, a measure of problem behavior such as the CBCL,

seems not suitable to use as a “core measure” of behavioral control. Moreover, as mentioned above, the definition of behavioral control as “the ability to control one’s emotions, behavior, and impulses and to adapt to rules” fits rather to the operationalization of constructs such as effortful control, self-regulation or emotion regulation (e.g. Rothbart; Eisenberg, Kochanska, ...) than to problem behavior. However, Behavioral control, operationalized according to Rothbart’s approach of effortful control, can be expected to predict various forms of problem behavior characterized by difficulties in the control of emotions and behavior, such as anxiety, aggression or delinquency (Eisenberg et al., 2004). Further, by assessing effortful control, the child’s skill to regulate behavior and emotions is assessed (e.g. *“Wanneer er ‘nee’ gezegd werd, hoe vaak...stopte uw kind met de verboden activiteit?”*), rather than the lack thereof (e.g. *“Mijn kind kan het niet helpen dat hij/zij dingen aanraakt zonder daarvoor toestemming te hebben gekregen”*) or the consequence of the child’s difficulties to employ this skill (e.g. *“Vernielt spullen van andere gezinsleden of van andere kinderen”*)

In addition, assessment of behavioral control operationalized as effortful control according to Rothbart’s definition, *“the capacity to inhibit a dominant response and initiate a subdominant response according to situational demand”*, may not only fit well to the developmental frameworks as used in WP2 and WP3, but also seems to suit a neurobiological perspective. See for instance the work on the role of the prefrontal cortex in cognitive control, in which cognitive control is defined as *“the ability to suppress inappropriate behavior and/or to switch to other behavior”* (e.g. Durston et al., 2006). Further, an important assumption of the model used by Rothbart and colleagues to develop the questionnaires, is that self-regulatory behaviors are closely linked to neurobiological processes. Individual differences in effortful control are thought to result from the efficiency of networks controlling attention

N.B. Although the effortful scales appear more suitable than the CBCL to assess behavioral control in Gravitation, we recommend to also include the CBCL in the assessments of Gravitation, but as a measure of problem behavior (which may be predicted by behavioral control) rather than a core measure of behavioral control.

Ad. 3 - Same or comparable assessment available for entire age range / also suitable for infants

Individual differences in attentional control have been found to emerge between 6 and 12 months of age, and the effortful control of impulses develops slowly during the toddler and (early) childhood years (Putnam, Ellis, & Rothbart, 2001). However, neural areas that are thought to be important in effortful control have been found to still undergo maturation throughout adolescence (Casey et al., 2005).

The series of temperament questionnaires, consisting of different age versions to adapt to developmental changes, allows for assessment of behavioral control from infancy (3 months) to adulthood. However, since attention in infancy is rather reactive in nature than effortful and behavioral control is largely achieved with adult support, in the infancy version (IBQ) the factor is labeled Orienting/Regulatory Capacity instead of Effortful Control and does not involve the subscale inhibitory control.

Literature on stability of factors across different age-versions & development of effortful control:

- Bridgett, D. J., Gartstein, M. A., Putnam, S. P., Lance, K. O., Iddins, E., Waits, R., ... & Lee, L. (2011). Emerging effortful control in toddlerhood: The role of infant orienting/regulation, maternal effortful control, and maternal time spent in caregiving activities. *Infant Behavior and Development*, 34(1), 189-199.
- Gartstein, M. A., Bridgett, D. J., Young, B. N., Panksepp, J., & Power, T. (2012). Origins of effortful control: Infant and parent contributions. *Infancy*.
- Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised infant behavior questionnaire. *Infant Behavior and Development*, 26(1), 64-86.
- Gerardi-Caulton, G. (2000). Sensitivity to spatial conflict and the development of self-regulation in children 24-36 months of age. *Developmental Science*, 3/4, 397-404.
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology*, 36, 220-232.
- Putnam, S. P., Ellis, L. K., & Rothbart, M. K. (2001). The structure of temperament from infancy through adolescence. *Advances in research on temperament*, 165-182.
- Putnam, S. P., Rothbart, M. K., & Gartstein, M. A. (2008). Homotypic and heterotypic continuity of fine-grained temperament during infancy, toddlerhood, and early childhood. *Infant and Child Development*, 17(4), 387-405.

Ad. 4 - Preferably used in the ongoing longitudinal studies of WP3

In both TRAILS and in Generation R these questionnaires have been used.

Ad. 5 - Internationally widely used to assess behavioral control / self-regulation;

See also ad. 1.

The measures are widely used to assess (aspects of) temperament. With regard to the measurement of effortful control, several studies (e.g. Eisenberg et al., 2001; Muhtadie et al., 2013; Zhou et al., 2009) only used de subscales 'attentional focusing' and 'inhibitory control' (and not 'low intensity pleasure' and 'perceptual sensitivity').

Literature:

- Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., ... & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child development*, 72(4), 1112-1134.
- Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., ... & Thompson, M. (2004). The relations of effortful control and impulsivity to children's resiliency and adjustment. *Child development*, 75(1), 25-46.
- Gartstein, M. A., Putnam, S. P., & Rothbart, M. K. (2012). Etiology of preschool behavior problems: Contributions of temperament attributes in early childhood. *Infant Mental Health Journal*, 33(2), 197-211.
- Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child development*, 68(2), 263-277.
- Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: continuity and change, antecedents, and implications for social development. *Developmental psychology*, 36(2), 220.
- Martinos, M., Matheson, A., & de Haan, M. (2012). Links between infant temperament and neurophysiological measures of attention to happy and fearful faces. *Journal of Child Psychology and Psychiatry*, 53(11), 1118-1127.
- Muhtadie, L., Zhou, Q., Eisenberg, N., & Wang, Y. (2013). Predicting internalizing problems in Chinese children: The unique and interactive effects of parenting and child temperament. *Development and psychopathology*, 25(03), 653-667.
- Zhou, Q., Lengua, L. J., & Wang, Y. (2009). The relations of temperament reactivity and effortful control to children's adjustment problems in China and the United States. *Developmental psychology*, 45(3), 724.

Ad. 6 – Psychometric Properties

The reliability of the effortful control scales (in particular ‘inhibitory control’ and ‘attentional focusing’) has been demonstrated in many studies. Further, many studies have investigated associations between these constructs and observational measures (e.g., Kochanska et al., 2000; Sulik et al., 2010), and have related the effortful control scales to measures of problem behavior (e.g. Eisenberg, Cumberland et al, 2001; Eisenberg, Spinrad et al., 2001).

Literature:

- De Pauw, S. S., Mervielde, I., & Van Leeuwen, K. G. (2009). How are traits related to problem behavior in preschoolers? Similarities and contrasts between temperament and personality. *Journal of abnormal child psychology*, 37(3), 309-325.
- Eisenberg, N., Cumberland, A., Spinrad, T. L., Fabes, R. A., Shepard, S. A., Reiser, M., ... & Guthrie, I. K. (2001). The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child development*, 72(4), 1112-1134.
- Eisenberg, N., Spinrad, T. L., Fabes, R. A., Reiser, M., Cumberland, A., Shepard, S. A., ... & Thompson, M. (2004). The relations of effortful control and impulsivity to children's resiliency and adjustment. *Child development*, 75(1), 25-46.
- Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised infant behavior questionnaire. *Infant Behavior and Development*, 26(1), 64-86.
- Majdandžić, M. & Van den Boom, D. C. (2007). Multi-method longitudinal assessment of temperament in early childhood. *Journal of Personality*, 75, 121-167.
- Putnam, S. P., Ellis, L. K., & Rothbart, M. K. (2001). The structure of temperament from infancy through adolescence. *Advances in research on temperament*, 165-182.
- Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: The Early Childhood Behavior Questionnaire. *Infant Behavior and Development*, 29(3), 386-401.
- Putnam, S. P., Helbig, A. L., Gartstein, M. A., Rothbart, M. K., & Leerkes, E. (2013). Development and Assessment of Short and Very Short Forms of the Infant Behavior Questionnaire—Revised. *Journal of personality assessment*, (ahead-of-print).
- Rothbart, M. K., Ahadi, S. A., Hershey, K. L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child development*, 72(5), 1394-1408.
- Rothbart, M.K., Ahadi, S.A., Hershey, K.L., & Fisher, P. (2001). Investigations of temperament at three to seven years: The Children's Behavior Questionnaire. *Child Development*, 72, 1394-1408.
- Sulik, M. J., Huerta, S., Zerr, A. A., Eisenberg, N., Spinrad, T. L., Valiente, C., ... & Taylor, H. B. (2010). The factor structure of effortful control and measurement invariance across ethnicity and sex in a high-risk sample. *Journal of psychopathology and behavioral assessment*, 32(1), 8-22.

Ad. 7 – Feasibility

Assessment of the Effortful Control scales seems to be feasible. Depending on the age version, the short forms consist of about 30 items. It should take a parent no longer than 5 or 6 minutes to complete these scales.

Ad. 8 – Ecological validity

See appendix 1 for subscales and items. The items refer to several activities that are part of children's daily life. For instance, the ECBQ (toddlers) asks about behavior of the child during play in the home, during outdoor play, and about responses of the child to “do's” en “don'ts”. The early adolescent version, for instance, asks about how the adolescent handles home work, keeping a secret, and waiting to open a present. See appendix 1 for further information.

Ad. 9 – Different informant versions available

The questionnaire is completed by parents in infancy and childhood (IBQ, ECBQ, CBQ), and can be assessed as parent-report as well as child self-report from middle childhood on (TMCQ, EATQ). Teacher-reports are also used.

Reasons for not choosing other widely used measures of behavior control

Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979):

The ICQ, developed by Bates and colleagues is an often used questionnaire to assess “difficult temperament” in infancy/early childhood. The ICQ assesses rather reactive than regulatory aspects of temperament, including several ‘negative affect’ items. Although the ICQ is a useful measure to assess ‘difficult temperament’, it seems to be less suitable as a core measure of behavioral control, because of its focus on reactive rather than regulatory aspects of temperament, and because of the limited age range.

Kochanska’s Test Battery (Kochanska, Murray, & Harlan, 2000):

Laboratory based tasks to measure effortful control between 22 months and 5 years. Not suitable for entire Gravitation age range, and conducting these tasks in all work packages may be too time consuming.

However, the approach used in development of these tasks is based on approach of Rothbart and colleagues. Further, previous studies found positive associations between children’s scores on these tasks and scores on parent-/teacher reported Effortful Control scales of the CBQ (e.g., Kochanska et al., 2000; Sulik et al., 2010)

Child Behavior Checklist

Although we recommend to include the CBCL in the assessments of Gravitation to measure children’s (and parents’) problem behavior, we do not propose the CBCL as a core measure of Behavioral Control. See ad.2 for argumentation.

Questions / To Discuss...

1 – Only use *effortful* control scales to assess behavioral control, or should *reactive* forms (e.g., impulsivity, discomfort, fear) also be included?

2 – Include all subscales of the Factor Effortful Control, or only the subscales ‘inhibitory control’ and ‘attentional focusing/shifting’, as often done in the international literature (See ad. 1)

3 – We included the Short Forms of the questionnaires (if available) in the current proposal. We would not recommend to use the Very Short Forms (see Allan et al., 2013). If only a limited number of subscales will be included in Gravitation it may be worth considering to use the subscales of the original complete version instead of the shortened version (around 50 items instead of 30 items).

4 – From which age on are child-reports included in the assessments? The TMCQ (age 7-10 years) and EATQ (10-15 years) have both been used in parent-reported versions and in child/adolescent-reported versions

Appendix 1 – Subscales & Items Effortful Control

Infant Behavior Questionnaire Revised – Short Form (3 – 12 months) *

* Not yet the complete (newest) version in Dutch

Orienting/Regulation Capacity subscales (31 items)

Duration of Orienting

Hoe vaak in de afgelopen week...

- 37. Keek uw kind langer dan 5 minuten naar plaatjes in boeken of tijdschriften?
- 38. Staarde uw kind langer dan 5 minuten naar een voorwerp (bijv. Mobiel, rand van de wieg of schilderij/plaat)?
- 39. Speelde uw kind 5 tot 10 minuten met één speelgoedje of object?
- 40. Speelde uw kind 10 minuten of langer met één speelgoedje of object?
- 46. Herhaalde uw kind langer dan 2 minuten dezelfde beweging met een object (bijv. Trappelen of slaan naar een mobiel)?
- 25 Watch adults performing household activities (e.g., cooking, etc.) for more than 5 minutes?

Low intensity Pleasure

How often during the last week did the baby enjoy:

- 13. being read to?
- 14. hearing the sound of words, as in nursery rhymes?
- 15. gentle rhythmic activities, such as rocking or swaying?
- 17. the feel of soft blankets?
- 18. being rolled up in a warm blanket?
- 19. listening to a musical toy in a crib?

When playing quietly with on of his/her favorite toys, how often did your baby:

- 67. enjoyed lying in the crib for more than 5 minutes?

Soothability

Two Week Time Span

When singing or talking to your baby, how often did s/he:

- 81. soothe immediately?
- 82.R take more than 10 minutes to soothe?

When showing the baby something to look at, how often did s/he:

- 83. soothe immediately?
- 84.R take more than 10 minutes to soothe?

When patting or gently rubbing some part of the baby's body, how often did s/he:

- 85. soothe immediately?
- 86.R take more than 10 minutes to soothe?

When rocking your baby, how often did s/he:

- 91.R take more than 10 minutes to soothe?

Heeft u één van de volgende troosttechnieken toegepast in de afgelopen 2 weken? Zo ja, hoe vaak troostte die methode de baby? Als u de methode niet hebt gebruikt kunt u 'Heb ik geen ervaring mee' aankruisen.

- 86. zingen of praten
- 89. de baby iets geven om naar te kijken
- 90. kloppen of zachtjes wrijven op een deel van het lichaam van de baby
- 84. wiegen

Cuddliness

Feeding: In the last week, while being fed in your lap, how often did the baby:

- 61.R seem eager to get away as soon as the feeding was over?

Daily activities: When being held, how often did the baby:

- 50.R Pull away or kick?
- 51. Seem to enjoy him/herself?

When rocked or hugged, in the last week, did your baby:

- 59. seem to enjoy him/herself?
- 60.R seemed eager to get away?
- 73.R push against you until put down?

Early Childhood Behavior Questionnaire - Short Form (1 – 3 Years)

Effortful Control subscales (32 items)

Attentional Focusing

Wanneer hij/zij aan het spelen was met zijn/haar favoriete speelgoed, hoe vaak

49. speelde uw kind langer dan 10 minuten?

Wanneer hij/zij kind bezig was met een activiteit die aandacht vraagt, zoals bouwen met blokken, hoe vaak

90.R ging uw kind snel over op een andere activiteit?

92.R was uw kind de activiteit snel beu?

Wanneer uw kind alleen speelde, hoe vaak

126.R werd uw kind gemakkelijk afgeleid?

127. speelde uw kind met iets voor meer dan 5 minuten?

Wanneer uw kind naar boeken met plaatjes keek, hoe vaak (in de Engelse versie staat hier nog bij dat het kind alleen/zelf de plaatjes boeken bekijkt)

169.R werd uw kind gemakkelijk afgeleid?

Attentional Shifting

Bij het buitenspelen, hoe vaak:

43. keek uw kind onmiddellijk wanneer u iets aanwees?

Wanneer hij/zij aan het spelen was met zijn/haar favoriete speelgoed, hoe vaak

51. speelde uw kind verder terwijl hij/zij ondertussen reageerde op uw opmerkingen of vragen?

Nadat hij/zij onderbroken werd, hoe vaak

60. keerde uw kind terug naar een voorgaande activiteit?

61.R had uw kind moeilijkheden om terug te keren naar een voorgaande activiteit?

Tijdens alledaagse activiteiten, hoe vaak

120. leek uw kind in staat zijn/haar aandacht gemakkelijk van de ene naar de andere activiteit te verplaatsen?

93. gaf uw kind u onmiddellijk aandacht wanneer u hem/haar riep?

Wanneer u aan het praten was met iemand anders, hoe vaak

179. wisselde uw kind gemakkelijk zijn aandacht van spreker naar spreker?

Wanneer u het druk had, hoe vaak

189. vond uw kind een andere activiteit wanneer het hem/haar gevraagd werd?

Cuddliness

Wanneer hij/zij gedragen werd, hoe vaak:

15.R duwde uw kind tegen u aan tot hij/zij werd neergezet?

18. vlijde uw kind zich tegen u aan?

Wanneer hij/zij zachtjes gewiegd of geknuffeld werd, hoe vaak

80.R leek uw kind graag weg te willen?

Tijdens een rustig moment samen met u, hoe vaak

103. wilde uw kind geknuffeld worden?

Wanneer u hem/haar vasthield op uw schoot, hoe vaak

160. leek uw kind zich te amuseren?

161. vlijde uw kind zich tegen uw lichaam aan?

Inhibitory Control

Wanneer gevraagd het NIET te doen, hoe vaak:

27.R raakte uw kind een aanlokkelijk voorwerp toch aan?

Wanneer er 'nee' gezegd werd, hoe vaak:

112. Stopte uw kind met de verboden activiteit

Wanneer gevraagd om te wachten op een begeerd iets (zoals een ijsje), hoe vaak:

143.R ging uw kind er toch meteen achteraan?

144. wachtte uw kind geduldig?

Wanneer u erom vroeg, hoe vaak

173. was uw kind in staat om een voortdurende activiteit te staken?

175. was uw kind in staat om voorzichtig te zijn met iets breekbaars?

Low Intensity Pleasure

Tijdens het buitenspelen, hoe vaak

12. genoot uw kind ervan om stil te zitten in het zonnetje?

Tijdens een rustig moment samen met u, hoe vaak

29. genoot uw kind ervan stillletjes alleen zachtjes toegezongen te worden?
30. glimlachte uw kind om de klank van woorden, zoals in wiegeliedjes?
31. genoot uw kind wanneer het toegesproken werd?
32. genoot uw kind van ritmische activiteiten zoals wiegen en schommelen?
Wanneer hij/zij zachtjes geschommeld werd, hoe vaak
146. glimlachte uw kind?

Childhood Behavior Questionnaire - Short Form (3 – 7 Years)

Effortful Control subscales (26 items)

Attentional Focusing:

- 16(R) - Wanneer zij met iets bezig is heeft zij moeite haar gedachten erbij te houden
- 21(R) - Doet het ene taakje na het andere zonder het af te maken
- 62 - Is erg geconcentreerd bezig wanneer zij tekent of kleurt
- 71 - Wanneer zij iets bouwt of in elkaar zet, gaat zij er helemaal in op en werkt dan lang door
- 84(R) - Is snel afgeleid wanneer zij naar een verhaaltje luistert
- 89 - Gaat soms helemaal op in een plaatjesboek en blijft er lange tijd in kijken

Inhibitory Control

- 38 - Kan wachten met nieuwe activiteiten als dat gevraagd wordt
- 45 - Bereidt zich voor op uitstapjes door uit te zoeken wat zij nodig zal hebben
- 53 - Heeft moeite met stil zitten wanneer het moet (bijv. in de bioscoop of bij de kapper)
- 67 - Volgt instructies goed op
- 73 - Benadert plekken waarvoor zij is gewaarschuwd langzaam en voorzichtig
- 81(R) - Kan gemakkelijk stoppen met iets wanneer er "nee" wordt gezegd

Low Intensity Pleasure:

- 26 - Neemt graag een warm bad
- 39 - Vindt het prettig tegen haar ouders of de oppas aan te kruipen
- 57 - Vindt het prettig als iemand tegen haar praat
- 65 - Kijkt graag in prentenboeken
- 72 - Vindt het leuk als iemand voor haar zingt
- 76 - Vindt de klank van woorden prettig, zoals rijmpjes
- 86 - Zit graag bij haar ouders op schoot
- 94 - Vindt het prettig om zachtjes te wiegen of te schommelen

Perceptual Sensitivity

- 5 - Merkt de gladheid of ruwheid van dingen die zij aanraakt op
- 13 - Merkt het op wanneer haar ouders iets nieuws aan hebben
- 24 - Lijkt zelfs naar hele zachte geluiden te luisteren
- 32 - Zegt er iets van als één van haar ouders iets aan het uiterlijk veranderd heeft
- 47 - Heeft snel door wanneer er iets nieuws in de huiskamer staat
- 83(R) - Merkt geurtjes als parfum, rook en kookluchtjes meestal niet op

Temperament in Middle Childhood Questionnaire (7 – 10 Years)*

* Not yet complete Dutch version / Short Form / Child self-report

Effortful control subscales (48 items)

Inhibitory control

- 6. Can stop him/herself when s/he is told to stop.
- 40. Can stop him/herself from doing things too quickly.
- 56. Has an easy time waiting to open a present.
- 79.R Has a hard time waiting his/her turn to talk when excited
- 88. Is very careful and cautious when crossing the street.
- 135. Likes to plan carefully before doing something.
- 141. Is able to keep secrets.
- 143.R Has a hard time slowing down when rules say to walk.

Attentional Focusing

- 7.R Is easily distracted when listening to a story.
- 17.R Looks around the room when doing homework.
- 78.R When working on an activity, has a hard time keeping her/his mind on it.
- 80.R Has a hard time paying attention.
- 82.R Needs to be told by teacher to pay attention.
- 120.R Needs to be told to pay attention.
- 149.R Gets distracted when trying to pay attention in class.

Low intensity pleasure

- 10. Likes the crunching sound of leaves in the fall.
- 32. Likes to play quiet games.
- 34. Likes the sound of poems.
- 73. Enjoys looking at books.
- 86. Likes quiet reading time.
- 92. Likes the feel of warm water in a bath or shower.
- 95. Likes to look at trees.
- 113. Likes to sit under a blanket.

Perceptual sensitivity

- 36. Notices the color of people's eyes.
- 44. Notices the sound of birds.
- 57. Notices odors like perfume, smoke, and cooking smells.
- 62. Can tell if another person is sad or angry by the look on their face.
- 77. Touches fabric or other soft material.
- 109. Notices small changes in the environment, like lights getting brighter in a room.
- 111. Notices things others don't notice.
- 114. Notices even little specks of dirt on objects.
- 123. Likes to run his/her hand over things to see if they are smooth or rough.
- 150. Notices when parents are wearing new clothing.

Activation control

- 20. Can make him/herself do homework, even when s/he wants to play.
- 26. Can say hello to a new child in class, even when feeling shy.
- 28.R Has a hard time speaking when scared to answer a question.
- 39. Can take a band-aid off when needed, even when painful.
- 46. Can make him/herself run fast, even when tired.
- 70.R Has a hard time making him/herself clean own room.
- 76. When a child is left out, can ask that child to play.
- 89.R Has a hard time working on an assignment s/he finds boring.
- 93.R Does a fun activity when s/he is supposed to do homework instead.
- 101. Can make him/herself get out of bed, even when tired.
- 103. Can apologize or shake hands after a fight.
- 132. Can make him/herself take medicine or eat food that s/he knows tastes bad.
- 139. Can make him/herself pick up something dirty in order to throw it away.
- 152.R Has a hard time getting going(moving) when tired.
- 157. Can make him/herself smile at someone, even when s/he dislikes them.

Early Adolescent Temperament Questionnaire – (10-15 Years) – Self-Report Version *

* Also parent-reported version available

Effortful Control subscales (16 items)

Activation Control

- 7. Het kost me veel moeite om dingen op tijd af te krijgen
- 18.R Voordat ik aan mijn huiswerk begin doe ik eerst een tijdje iets leuks, zelfs als dat eigenlijk niet de bedoeling is.
- 30. Als ik een moeilijke taak moet doen, begin ik er gelijk aan.
- 39. Ik heb mijn huiswerk eerder af dan nodig is
- 49.R Ik stel dingen die ik moet doen uit tot het laatste moment

Attention

- 1. Ik vind het makkelijk om mijn gedachten goed bij mijn huiswerk te houden (*huiswerk is thuis een opdracht maken voor school, bijvoorbeeld een toets leren of een spreekbeurt maken*)
- 34.R Ik vind het moeilijk op school om van de ene les op de andere les over te schakelen (bijvoorbeeld eerst rekenen, dan taal)
- 38.R Als ik probeer mijn aandacht bij mijn schoolwerk te houden, word ik snel afgeleid door geluiden om me heen
- 41. Ik kan goed verschillende dingen die om me heen gebeuren in de gaten houden
- 59. Ik let goed op als iemand me uitlegt hoe ik iets moet doen
- 61.R Als ik met iets bezig ben, stop ik vaak voordat het af is en ga dan iets anders doen

Inhibitory Control

- 10.R Ik vind het moeilijk om een cadeautje pas uit te pakken als het mag
- 14. Als iemand zegt dat ik ergens mee moet stoppen, lukt me dat makkelijk
- 26.R Hoe meer ik mijn best doe om geen verkeerde dingen te doen, hoe groter de kans dat ik die dingen **toch** doe
- 43. Ik kan makkelijk een geheim bewaren
- 63. Als ik een plan heb hou ik net zolang vol tot ik mijn doel bereikt heb

Adult Temperament Questionnaire – Short Form (15+ Years)

Effortful control subscales (19 items)

Activation Control

- 2.R Ik kom vaak te laat op afspraken
- 8.R Ik maak vaak plannen die ik dan vervolgens niet uitvoer.
- 15. Ik ben goed in staat om een taak vol te houden, zelfs als ik het liever niet doe.
- 27. Ik kan mezelf ertoe zetten een moeilijke taak te doen, ook al heb ik er geen zin in.
- 47. Als ik iets bedenkt wat nog gedaan moet worden, begin ik er meestal meteen aan.
- 55. Meestal heb ik dingen eerder af of gedaan dan nodig is (bijvoorbeeld rekeningen betalen, studie-opdrachten).
- 72.R Als ik bang ben over hoe een situatie zal uitpakken, vermijd ik haar meestal.

Attentional Control

- 5.R Ik vind het vaak moeilijk om te switchen tussen verschillende taken.
- 29.R Als ik me probeer te concentreren, raak ik gemakkelijk afgeleid.
- 35. Als ik onderbroken of afgeleid word, kan ik daarna meestal mijn aandacht gemakkelijk weer richten op datgene waar ik mee bezig was.
- 40.R Ik vind het moeilijk om me te concentreren als ik van streek ben.
- 50.R Als ik blij en opgewonden ben over iets leuks wat gaat gebeuren vind ik het erg moeilijk om mijn aandacht te richten op dingen die concentratie vragen.

Inhibitory Control

- 11. Zelfs als ik me energiek voel kan ik zonder veel moeite stil zitten als dat nodig is.
- 26. Ik kan gemakkelijk mijn lachen inhouden in situaties waarin het niet gepast is om te lachen.
- 43. Ik kan gemakkelijk op mijn beurt wachten met praten, ook al ben ik opgewonden en wil ik graag mijn ideeën vertellen.
- 53.R Ik heb vaak moeite weerstand te bieden aan mijn verlangen naar eten of drinken.
- 60.R Als ik ergens enthousiast over ben, vind ik het meestal moeilijk om me er niet meteen in te storten, voordat ik over de gevolgen heb nagedacht.
- 63.R Als ik in een winkel iets leuks zie, vind ik het meestal erg moeilijk om me te beheersen en het niet te kopen.
- 76. Ik kan gemakkelijk lollig gedrag dat ongepast is onderdrukken.

Appendix 2 - Go no Go task

Construct	Suppression of dominant response; Inhibitory control
Measure	Go no Go Task
Duration	5 minutes

References

Simpson, A., & Riggs, K. J. (2006). Conditions under which children experience inhibitory difficulty with a "button-press" go/no-go task. *Journal of Experimental Child Psychology*, 94(1), 18-26.

Description

The Go-No-Go task is a computerized task where children are instructed to catch as many fish (Go stimuli, 75%) as possible by pressing the button when a fish appears on the screen. They are instructed to let the shark (No-Go stimuli, 25%) swim by withholding the button press. Auditory feedback is provided when appropriately catching a fish or inappropriately catching a shark. Stimuli are presented for 1,500 ms, with an interstimulus interval of 1,000 ms. The dependent variable is the proportion of correct trials; the number of No-Go trials the child correctly did not press the button divided by the total number of No-Go trials. The Go-no-Go task can be administered across cohort 1 and 2 (youngest age; preschoolers)