Developmental Pathways from Sustained Attention and Social Competence to Effortful Control

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BACKGROUND

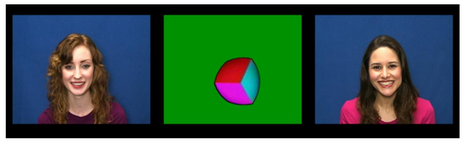
Effortful control (a dimension of temperament involving the ability to inhibit responses, detect errors, and engage in planning) has been shown to be an important predictor of socioemotional development and cognitive outcomes in children (Rothbart & Bates, 2006; Rothbart & Putnam, 2002; Valiente et al., 2010, 2011). Although research has demonstrated that temperament, including effortful control, predicts a wide range of outcomes, much less research has focused on uncovering which early developing skills predict temperament outcomes. Some research has shown that individual differences in early social interaction and attention skills predict effortful control (see Eisenberg et al., 2011, for a review). Our prior research (Ramirez et al., 2022) demonstrated that longer sustained attention at 12 months predicted greater social competence at 18 months, which in turn predicted greater effortful control at 48 months of age. In the present study, we extend these findings by assessing the developmental pathways from sustained attention and social competence at later ages (18 and 36 months) to effortful control at 48 months. This could provide a more complete understanding of developmental pathways from sustained attention and social competence to effortful control.

METHODS

Children (N = 98; 50 F) participated in an ongoing, longitudinal study from 3 to 72 months of age. The present study focuses on data from 12, 18, 36, and 48 months. Predictors: At 12 and 18 months, sustained attention to social events was assessed using the Multisensory Attention Assessment Protocol (MAAP), a new individual differences measure assessing attention to faces and voices of women speaking (Bahrick et al., 2018). Sustained attention was calculated as the proportion of total looking time to the video displays of women speaking in the presence of a distractor event (morphing geometric shapes; see Figure 1). At 18 and 36 months, social competence was assessed using the Infant Toddler Social Emotional Assessment (Carter & Briggs-Gowan, 2006). Outcome: At 48-months, effortful control was assessed via the Children's Behavior Questionnaire (Rothbart et al., 2001).

Figure 1

Static Images of Social Events From the MAAP



Note. Trials on the MAAP consisted of a 3-s central stimulus (geometric animation), followed by two side-by-side lateral events of women speaking. The movements of one of the women were synchronous with the natural soundtrack, while the movements of the other were asynchronous. For half of the trials, the central stimulus remained on, providing an additional source of distracting information (Bahrick et al., 2018).

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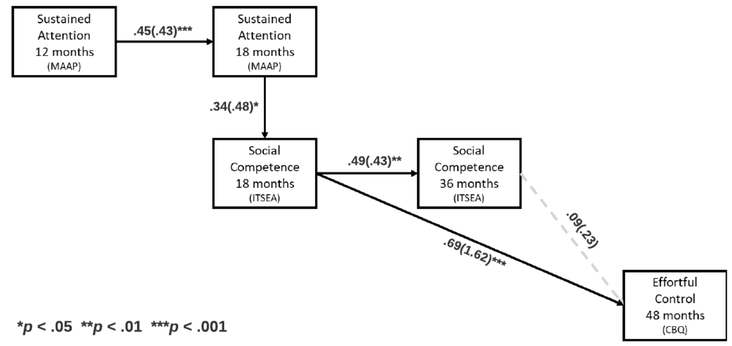
RESULTS

Bivariate correlations. Correlational analyses served to guide the construction of our structural equation model (SEM). Results indicated significant correlations among social competence at 18 and 36 months and effortful control at 48 months, rs > .43, ps < .01. Sustained attention at 18 months predicted social competence at 18 (but not 36) months and effortful control at 48 months, rs > .25, ps < .015, and sustained attention at 12 months predicted sustained attention at 18 months, r = .45, p < .001 (but not other measures).

Model results. Findings from our model demonstrated developmental pathways from sustained attention at 12 months to social competence at 18 months and in turn to effortful control at 48 months. Our new model shows good fit, $X^2(5) = 3.67$, p = .60, and extends our prior findings. Longer sustained attention at 12 months predicts longer sustained attention 18 months, p < .001, which in turn predicts greater social competence at 18 months, p = .02, which in turn predicts greater effortful control at 48 months, p = .001 (holding constant social competence at 36 months). In addition, greater social competence at 18 months predicts greater social competence at 36 months, p = .01. However, social competence at 36 months was not a significant predictor of effortful control at 48 months, p = .67, after holding constant social competence at 18 months.

Figure 2

A Structural Equation Model Depicting Pathways From Sustained Attention at 12 and 18 Months to Social Competence at 18 and 36 Months to Effortful Control at 48 Months



Note. Standardized path coefficients are presented outside parentheses and unstandardized path coefficients are presented within parentheses. Significant pathways are depicted by solid lines and non-significant pathways are depicted by dashed lines.

CONCLUSIONS

Greater sustained attention to faces of women speaking in the presence of a distractor and greater social competence across infancy and early childhood predict greater effortful control at 48 months of age. Interestingly, social competence at 18 months (but not 36 months) emerged as the strongest predictor of effortful control at 48 months and demonstrate its importance as a mediator between early attention skills and later effortful control. These findings reveal the foundational role of early attention to dynamic faces and voices and how this cascades to social competence, and, in turn, effortful control (i.e., planning, error monitoring, and inhibiting responses) in childhood.

REFERENCES

Bahrick, L. E., Todd, J. T., & Soska, K. C. (2018). The Multisensory Attention Assessment Protocol (MAAP): Characterizing individual differences in multisensory attention skills in infants and children and relations with language and cognition. *Developmental Psychology, 54*, 2207–2225. https://www.doi.org/10.1037/dev0000594

Carter, A. S., & Briggs-Gowan, M. J. (2006). Infant-Toddler Social and Emotional Assessment Examiners Manual. PsychCorp: Harcourt Assessment.

Eisenberg, N., Smith, C. L., & Spinrad, T. L. (2011). Effortful control: Relations with emotion regulation, adjustment, and socialization in childhood. In K. D. Vohs & R. F. Baumeister (Eds.), *Handbook of self-regulation: Research, theory, and applications* (pp. 263–283). Guilford Press.

Ramirez, B., Edgar, E. V., Todd, J. T., Eschman, B., & Bahrick, L. E. (2022, July 7-10). The development of temperament through early multisensory attention and social skills. Poster presentation at the meeting of the *International Congress of Infant Studies*.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In N. Eisenberg, W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology: Social, emotional, and personality development, Vol. 3* (6th ed., pp. 99, 166). John Wiley & Sons, Inc.

Rothbart, M. K., & Putnam, S. P. (2002). Temperament and socialization. In L. Pulkkinen & A. Caspi (Eds.), *Paths to successful development: Personality in the life course* (pp. 19–45). Cambridge University Press. https://doi.org/10.1017/CBO9780511489761.002

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. http://www.jstor.org/stable/3654394

Valiente, C., Eisenberg, N., Haugen, R., Spinrad, T. L., Hofer, C., Liew, J., & Kupfer, A. (2011). Children's effortful control and academic achievement: Mediation through social functioning. *Early Education and Development, 22*(3), 411–433. https://doi.org/10.1080/10409289.2010.505259

Valiente, C., Lemery-Chalfant, K., & Swanson, J. (2010). Prediction of kindergartners' academic achievement from their effortful control and emotionality: Evidence for direct and moderated relations. *Journal of Educational Psychology, 102*(3), 550.