

## Introduction

- Several children with Tourette syndrome (TS) have recurrent episodes of sudden and intense anger, known as explosive outbursts.<sup>1,2</sup>
- Characteristics influencing the onset of such outbursts remain poorly understood.
- Being reprimanded or having plans/routine changed may precipitate explosive outbursts.<sup>3</sup>
- These difficulties could reflect behavioral inflexibility, which refers to a pattern of rigid behavior in situations requiring to adapt one's behavior.<sup>4</sup>

## Objectives

- Assess whether children with TS have enhanced behavioral inflexibility relative to typically developing children (TDC).
- Assess whether behavioral inflexibility is associated with explosive outbursts.

## Methods

- Data were aggregated from 3 ongoing studies
  - Study 3 (n = 43, 14 girls)
    - Range: 6-14 years old
    - Mean =  $9.7 \pm 2.3$
- Participants
  - Study 1 (n = 44)
    - 26 children with TS (5 girls), 18 TDC (7 girls)
    - Range: 10-14 years old
    - Mean TS =  $11.7 \pm 1.4$
    - Mean TDC =  $11.8 \pm 1.4$
  - Study 2 (n = 40, 13 girls)
    - Range: 9-17 years old
    - Mean =  $12.1 \pm 2.2$
- Measures
  - Behavioral inflexibility scale<sup>4</sup> (parent-report)
  - Rage Attack Questionnaire-Revised<sup>5</sup> (self-report: study 1, parent-report: studies 1, 2, & 3)

## Results

### Study 1

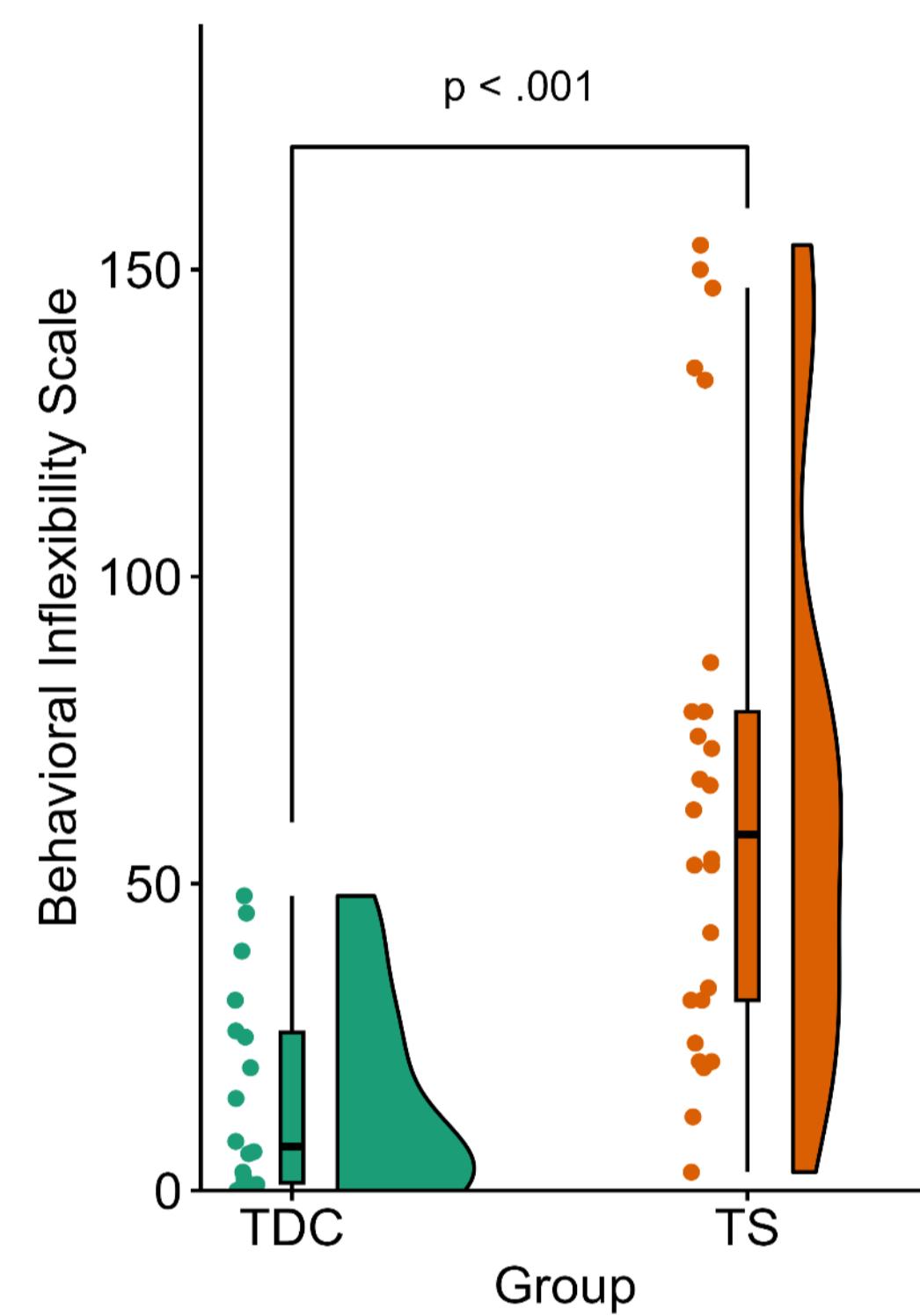


Figure 1: Behavioral inflexibility in TDC and children with TS

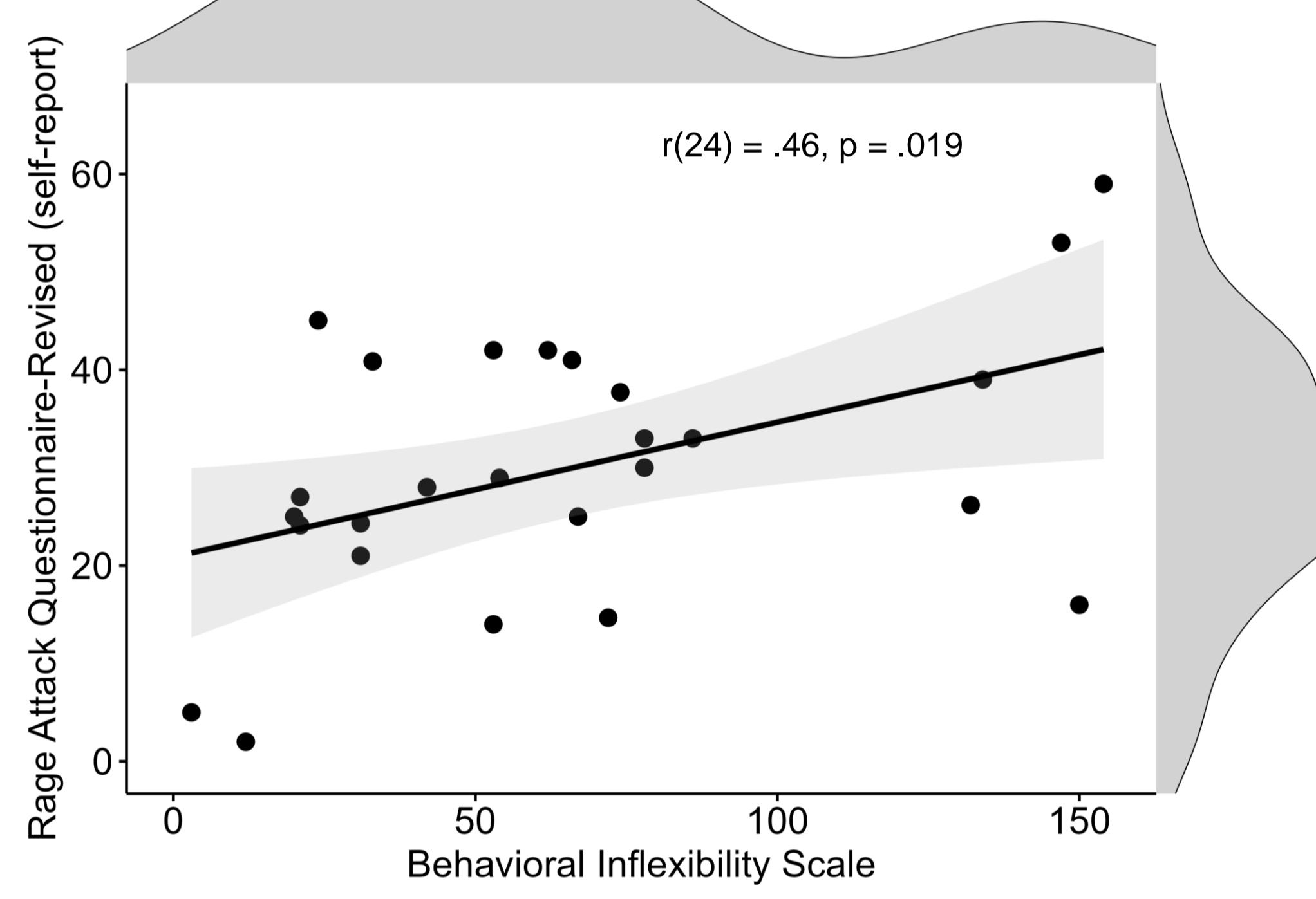


Figure 2: Association between behavioral inflexibility and self-reported explosive outbursts in Study 1

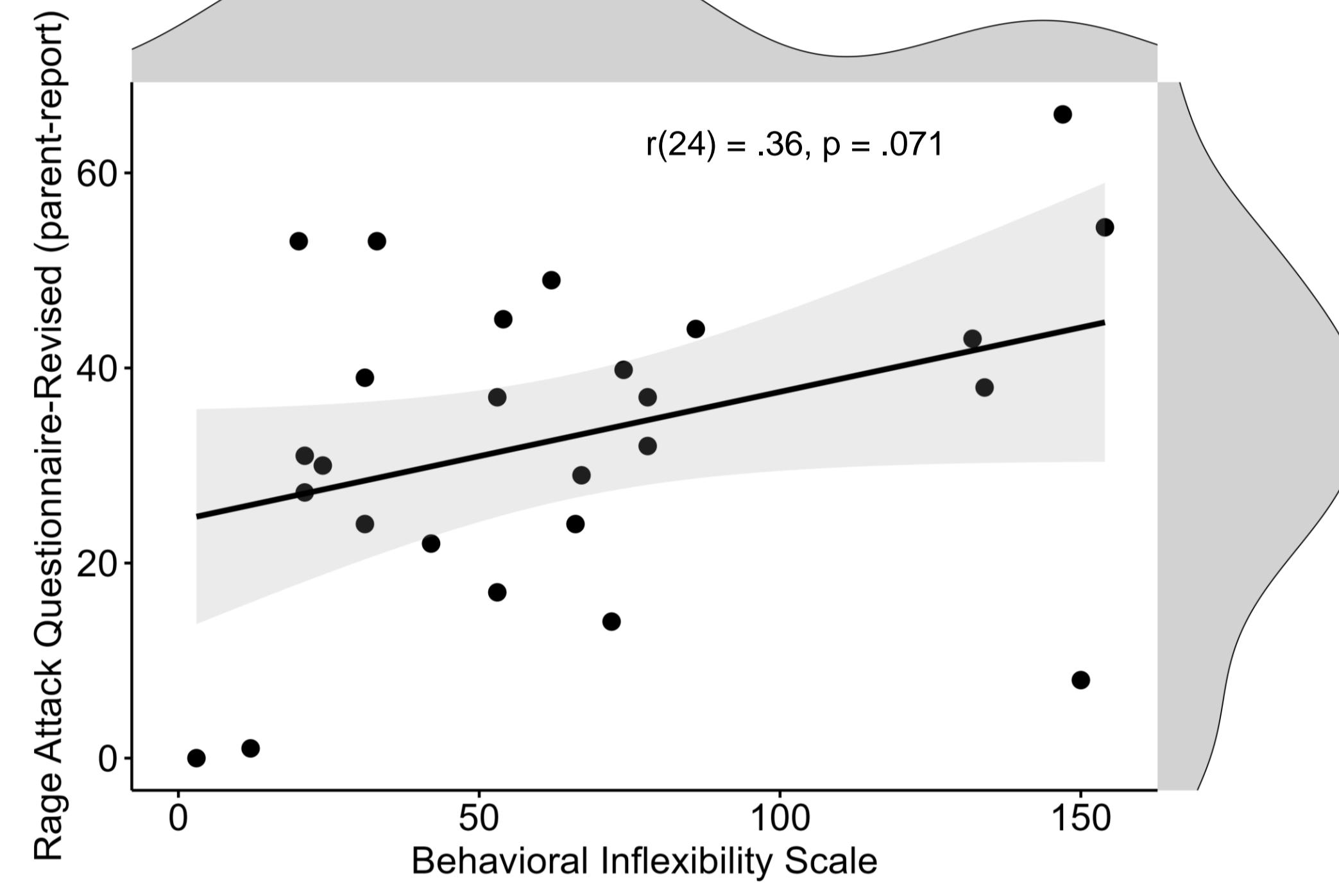


Figure 3: Association between behavioral inflexibility and parent-reported explosive outbursts in Study 1

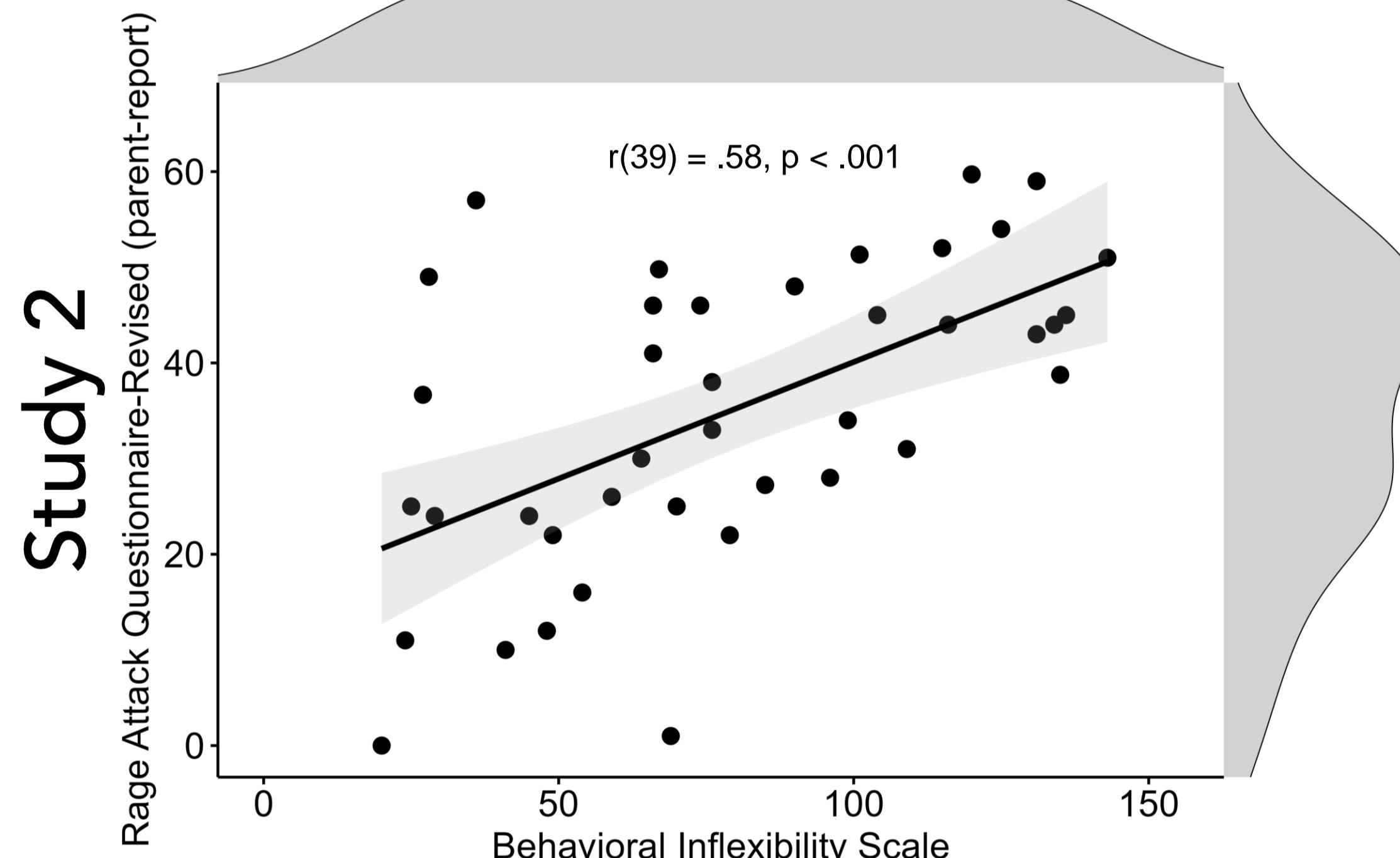


Figure 4: Association between behavioral inflexibility and explosive outbursts in Study 2

### Study 3

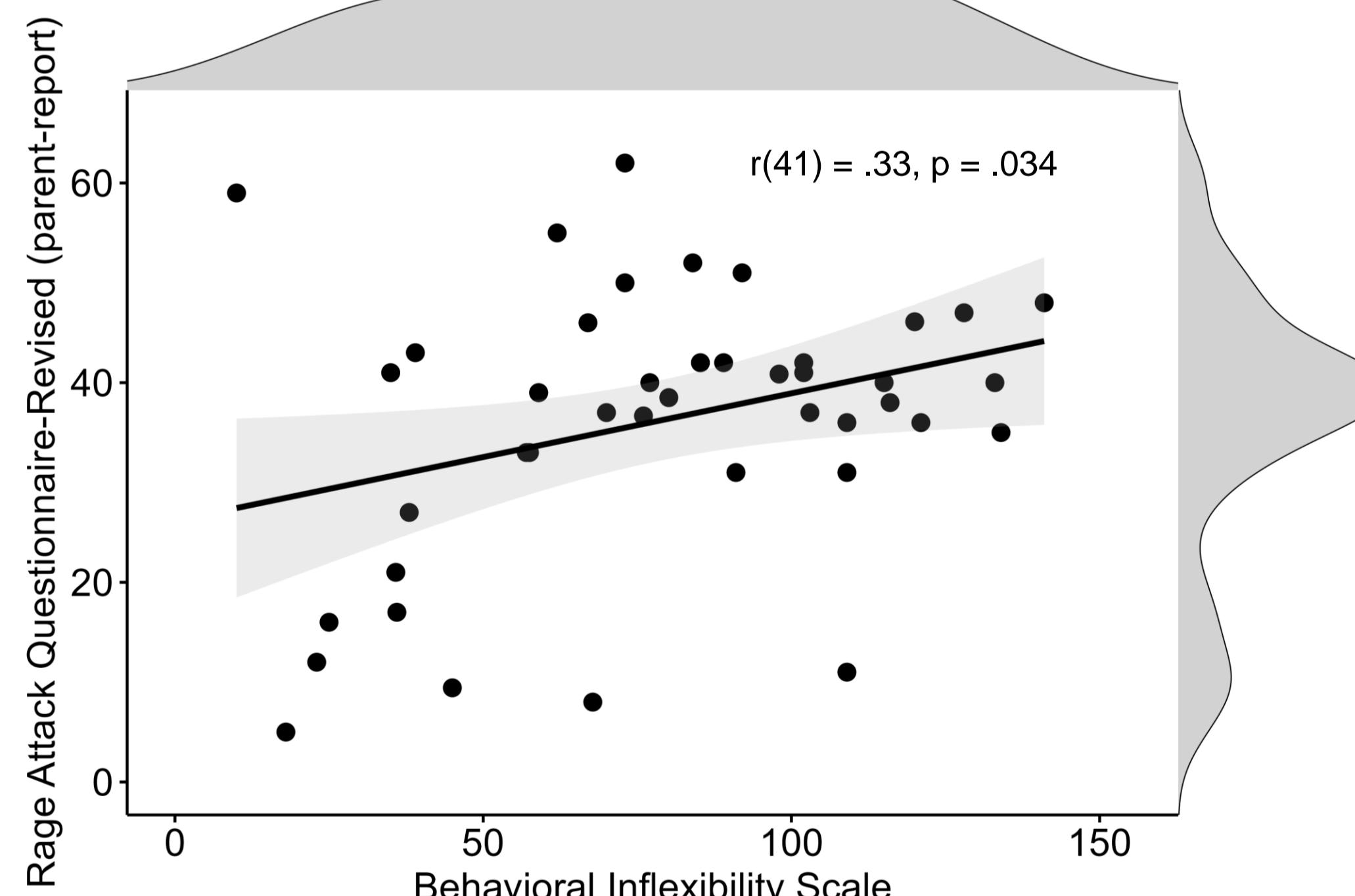


Figure 5: Association between behavioral inflexibility and explosive outbursts in Study 3

## Conclusions

- Children with TS showed increased behavioral inflexibility scores relative to typically developing children.
- Across studies, we found positive associations between ratings on the BIS and RAQ-R.
- These results suggest that behavioral inflexibility may be an important feature in children with TS, and that it may also drive explosive outbursts. Behavioral inflexibility may thus be an important factor to address during interventions for explosive outbursts.

## References

- Ashurova M, Budman C, Coffey BJ. Ticked Off: Anger Outbursts and Aggressive Symptoms in Tourette Disorder. Child and adolescent psychiatric clinics of North America. 2021;30(2):361-373.
- Conte G, Valente F, Fioriello F, Cardona F. Rage attacks in Tourette Syndrome and Chronic Tic Disorder: a systematic review. Neurosci Biobehav Rev. 2020;119:21-36.
- Budman CL, Rockmore L, Stokes J, Sossin M. Clinical phenomenology of episodic rage in children with Tourette syndrome. J Psychosom Res. 2003;55(1):59-65.
- Lecavalier L, Bodfish J, Harrop C, et al. Development of the Behavioral Inflexibility Scale for Children with Autism Spectrum Disorder and Other Developmental Disabilities. Autism Research. 2020;13(3):489-499.
- Müller-Vahl KR, Kayser L, Pisarenko A, et al. The Rage Attack Questionnaire-Revised (RAQ-R): Assessing Rage Attacks in Adults With Tourette Syndrome. Frontiers in psychiatry. 2020;10(956).

## Acknowledgements

This work was funded by the CIHR, though a postdoctoral fellowship (MFE164627) awarded to SMB, and by the Clinical Research Training Scholarship in Tourette syndrome (also awarded to SMB) from the TAA & ABF, in collaboration with the AAN. SMB received additional support through a scholarship from the Fondation petits trésors.