

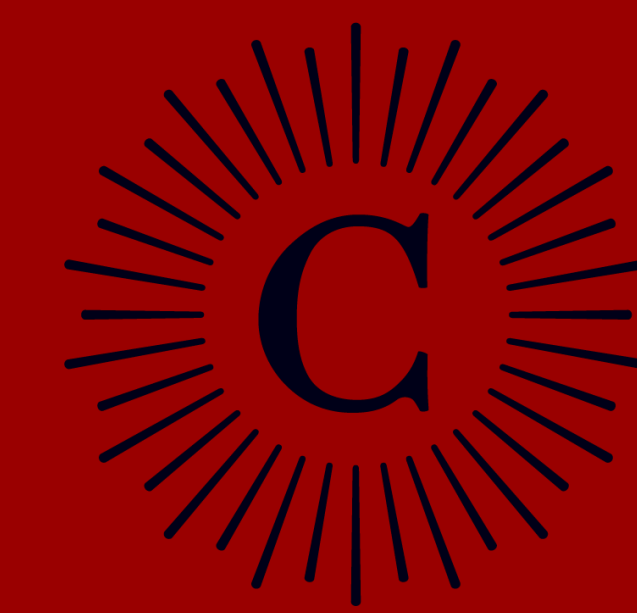


Long-term music instruction partially supports the development of socioemotional skills

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BACKGROUND

- Formal music instruction has been shown to improve both near transfer (rhythmic entrainment¹ and pitch-matching²) and far transfer skills (speech-in-noise recognition³ and socioemotional skills⁴)
- Our understanding of the relationship between socioemotional skills and music training is obscured by differences in musical instruction, educational paradigm, and program length⁵⁻⁸.
- Using data from a 7-year longitudinal study, we aimed to understand the development of rhythmic entrainment, pitch-matching, and socioemotional skills.
- We also aimed to explore the social implications of pitch-matching and replicate the positive relationship between rhythmic entrainment and socioemotional skills.

METHODS

Participants

- Eighty-three children (5-8 years old at baseline, $M = 6.81$; 59% male, 41% female)
- Participants were primarily Latino, from bilingual households, and came from low socioeconomic backgrounds

After-school programs

- Music ($N = 26$): children enrolled in the Youth Orchestra of Los Angeles (YOLA) following the “El Sistema” approach
- Sports ($N = 28$): children enrolled in either a community-based swimming or soccer program
- Control ($N = 29$): children who were not enrolled in any systematic extracurricular programs

Measures

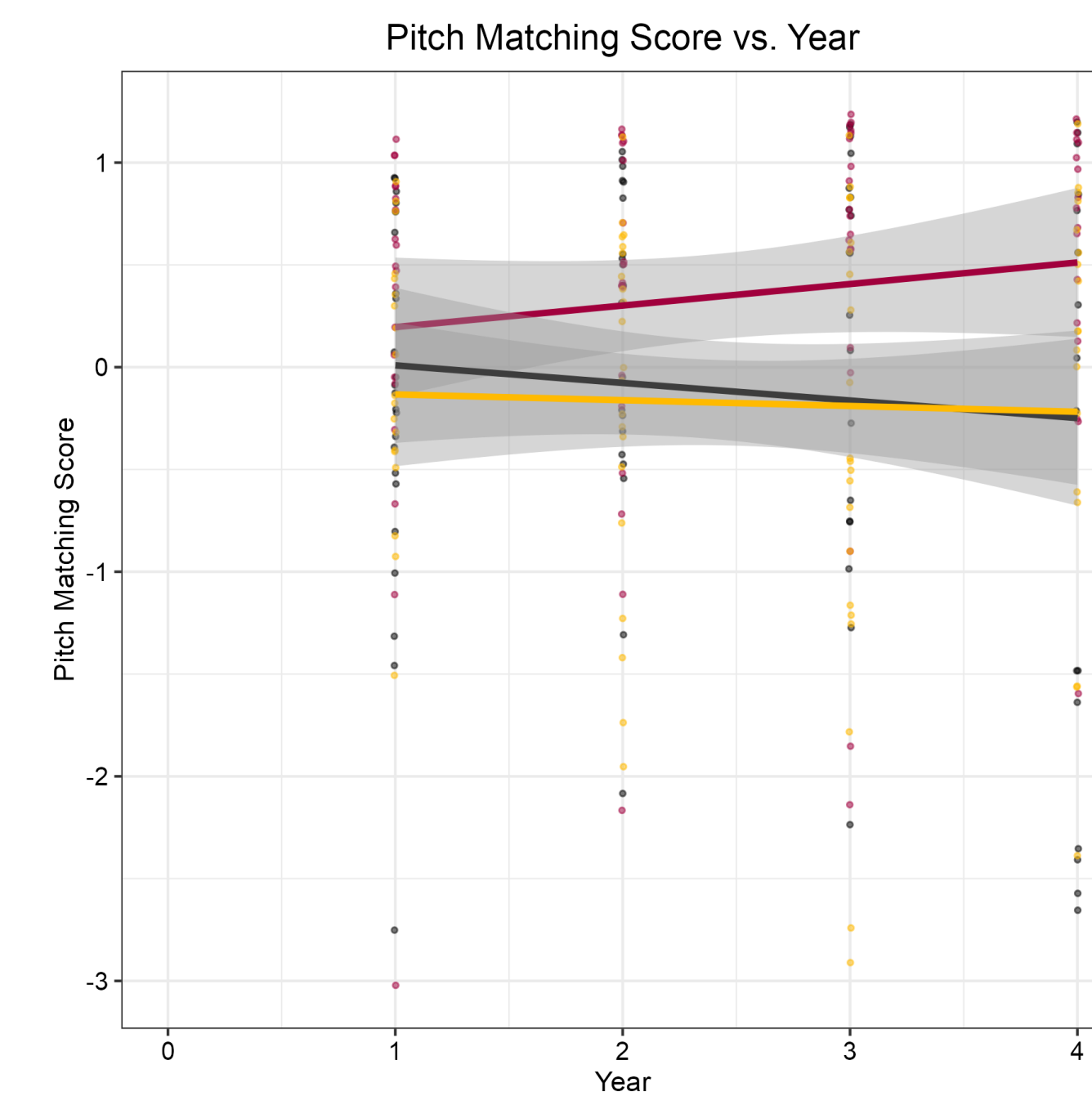
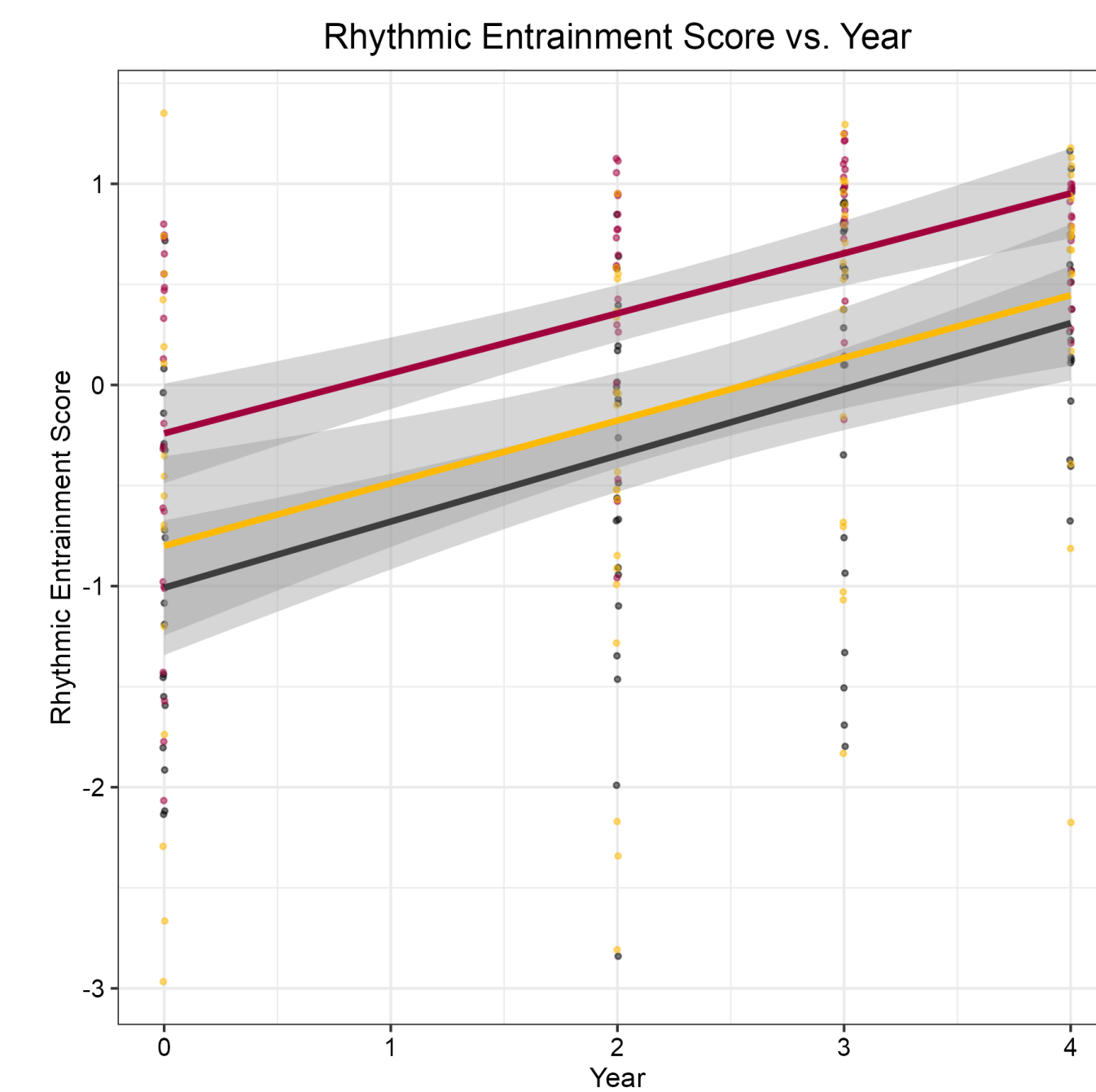
- Rhythmic Entrainment:** drummed at 120- or 180-bpm with a pre-recorded beat, or together with an experimenter
- Pitch Matching:** repeated 10 melodies sung by an experimenter
- Sharing:** shared stickers with a pictured stranger or a friend
- Index of Empathy for Children (IECA):** a trait empathy questionnaire prompting participants to think about different social scenarios
- Reading the Mind in the Eyes (Eyes Test):** participants viewed photos of eyes and were asked to evaluate the emotional state of the individual
- Fiction Emotion Matching:** participants viewed a set of fictional clips and then evaluated the emotional state of the character
- Wechsler Abbreviated Scale of Intelligence (WASI-II):** a battery of cognitive tasks used to measure general cognitive ability (FSIQ)
- Digit-Span:** participants were read-aloud a sequence of numbers to be repeated in either the order they heard it or in reverse

Analysis

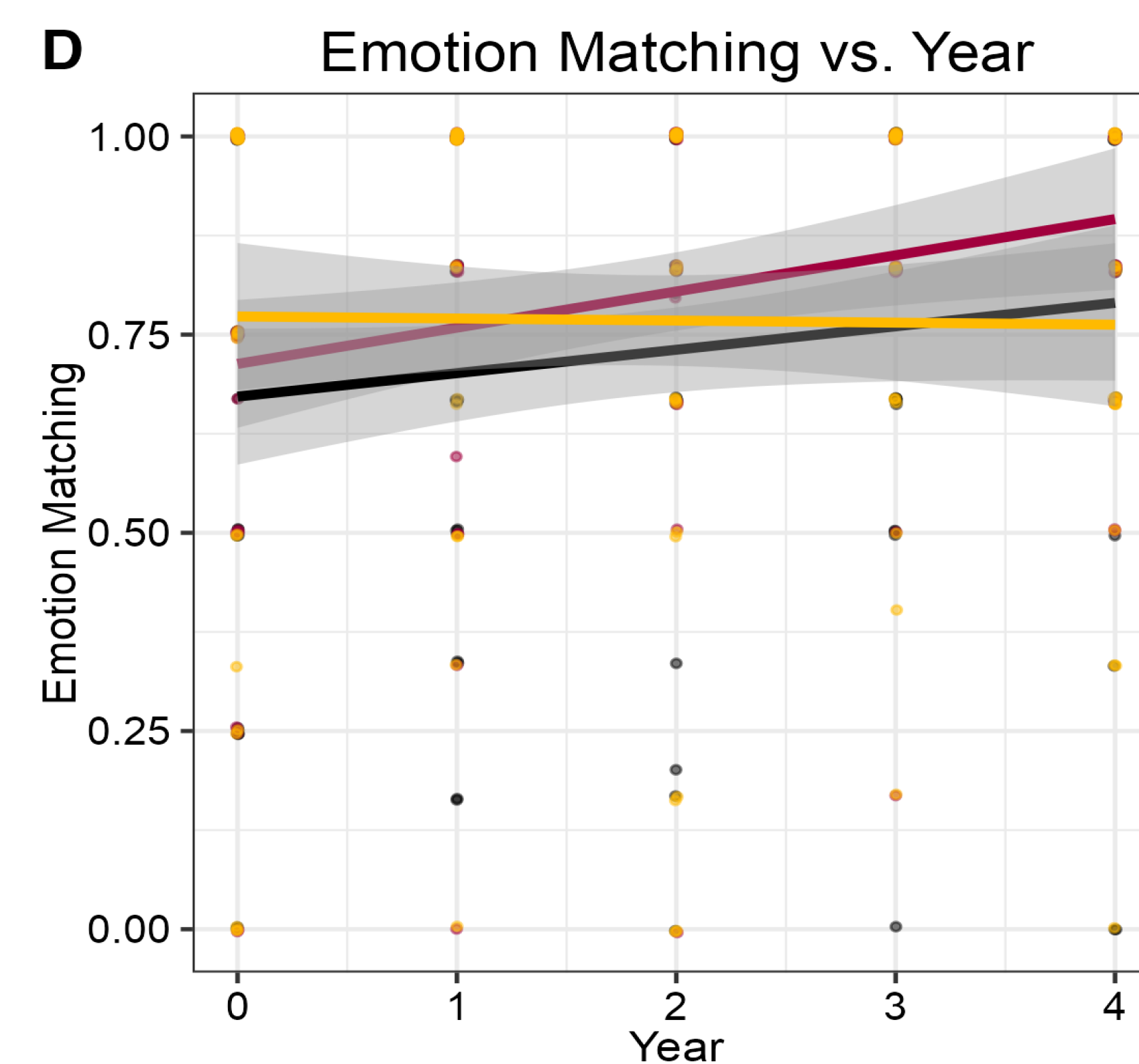
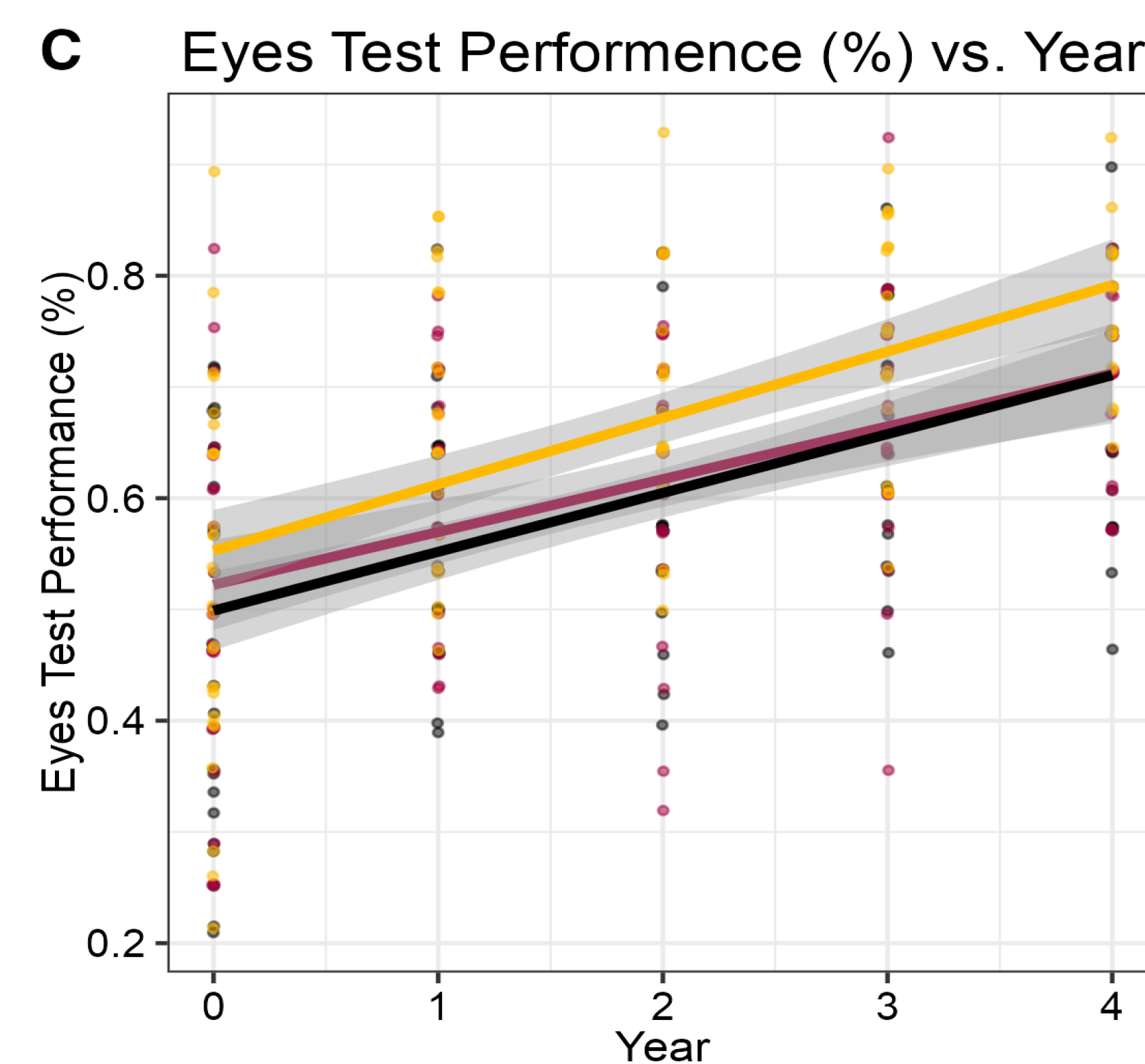
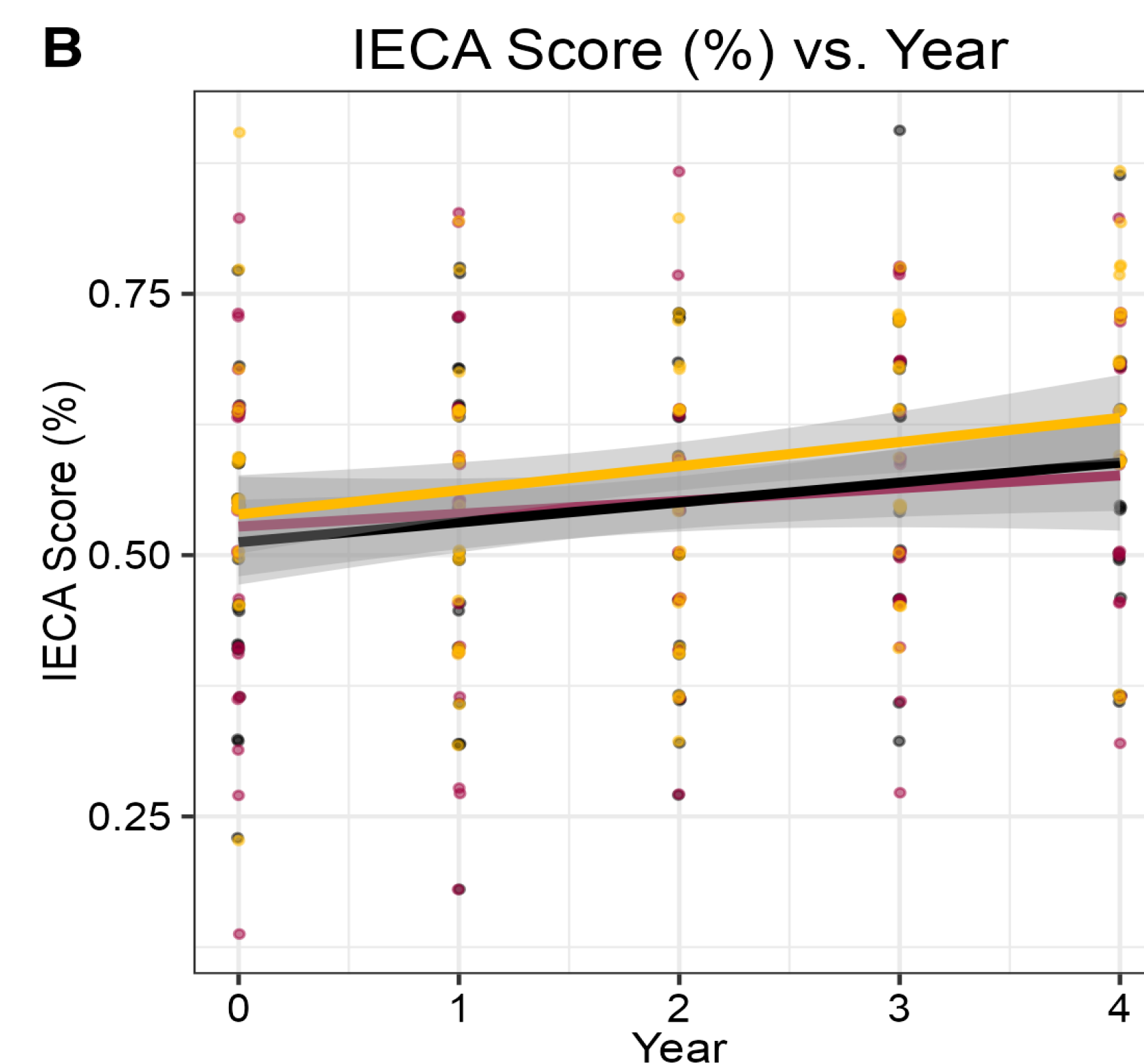
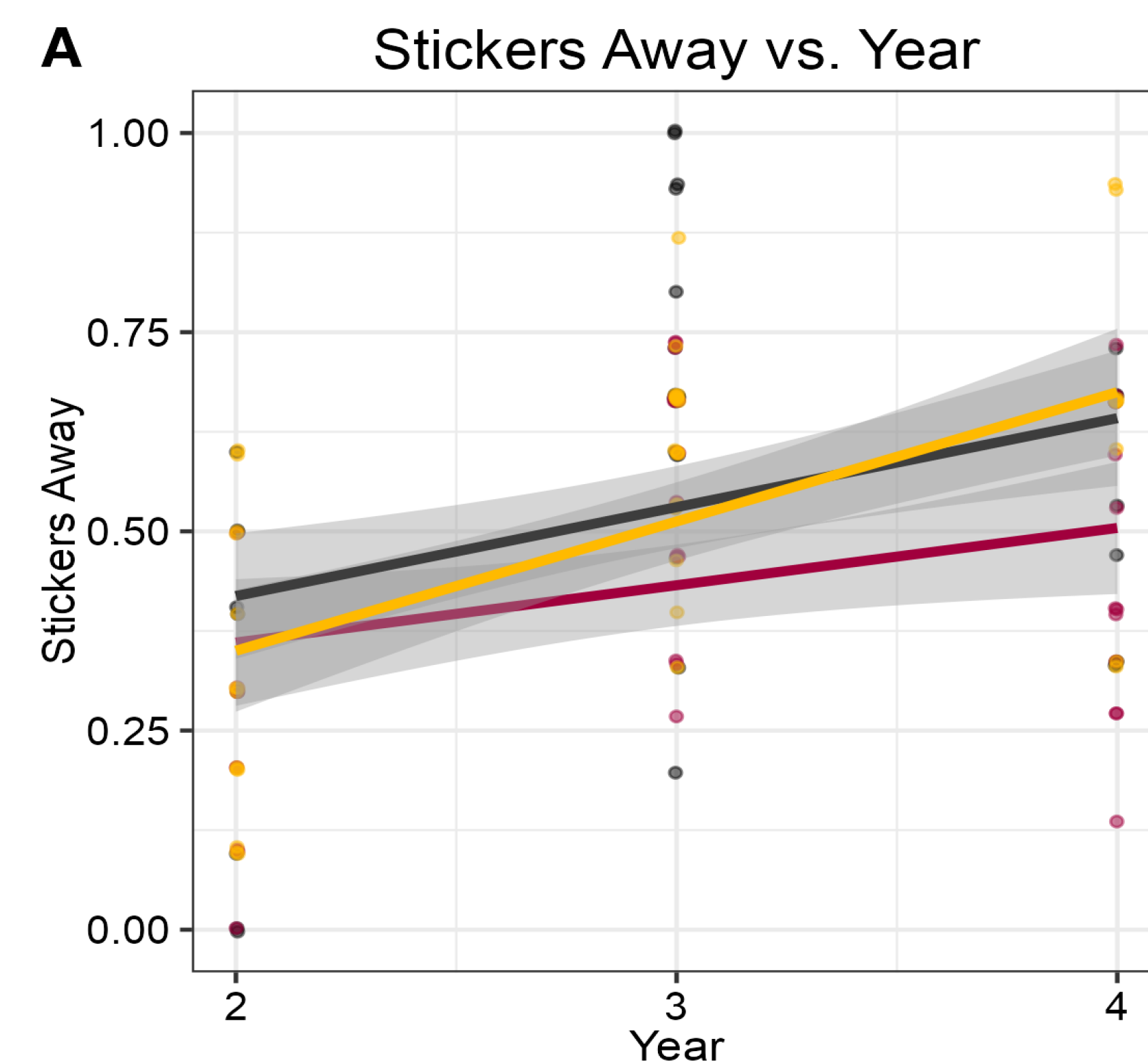
- Correlations** between socioemotional measures were weak to trivial suggesting they are different constructs
- Principal Component Analysis (PCA)** was used to reduce dimensionality for our regression by reducing correlated variables (i.e., pitch-matching and rhythmic entrainment) into a single component
- Linear Mixed Effects Models** were used to measure the growth of each outcome variable. Model selections were based on BIC

RESULTS

Musical Development



Socioemotional Development



Group: Music (red), Sport (yellow), Control (black)

Musical Development

- Rhythmic entrainment was significantly predicted by year ($B = 0.29$, $p < 0.001$), but no differences in group by year interaction were found
- Pitch-matching improved significantly over time for those in the music group relative to the control group ($B = 0.26$, $p = 0.016$), however, year itself failed to predict pitch-matching ($p = 0.43$)

Socioemotional Development

- Sticker sharing increased by 7.2% each year ($B = 0.072$, $p = 0.024$). Each year, those in the sports group gave away about 9% more stickers than those in the music group ($B = 0.09$, $p = 0.042$)
- Neither an improvement over time nor group by year differences were found for IECA performance
- The Eyes Test varied exclusively as a function of time ($B = 0.05$, $p < 0.001$)
- Fiction emotion matching performance was significantly predicted by year ($B = 0.05$, $p = 0.003$), with musicians performing about 0.05 points greater than those in the sports group each year ($B = 0.05$, $p = 0.021$)

Socioemotional skills predicted by music production measures

- Few consistent patterns were found between music production measures and measures of socioemotional skills. This suggests that neither rhythmic entrainment nor pitch-matching ability can reliably predict sharing, trait empathy, theory of mind, or emotion-recognition

DISCUSSION

Musical Development

- Formal music instruction significantly improved pitch-matching relative to controls; however, there were no significant differences found between the music and sports groups. Likewise, there were no time-related improvements
- Alternatively, a global improvement was found in rhythmic entrainment over time; however, there was no musicians' advantage

Socioemotional Development

- Sharing behavior generally improved over time, following an inverted-U shape curve. Interestingly, those in the sports group shared at a higher rate than those in the music group
- The growth curves for the empathy measures followed separate and unique patterns. IECA did not improve over time, the Eyes Test drastically improved over time, and the fiction emotion-matching task both improved over time and with a greater yearly improvement for musicians relative to athletes
- A musician's heightened sensitivity to emotional cues in auditory stimuli may lead to an improvement in recognizing and ultimately embodying an emotion

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