

Associations between Maternal Responsiveness and Infant Neural Social Selectivity and Later Language in a rural Gambian Context

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INTRODUCTION

- Maternal responsiveness (prompt and contingent reactions to infants' exploratory and communicative acts) is positively associated with infants' later language outcomes in the second year of life^{1,2,3}
- Most of this work has been carried out in high-income countries (HICs), but responsiveness behaviours differ between cultures^{4,5}, raising questions about the generalisability of links with infant development.
- Additionally, infants' language learning in social interactions with caregivers may also be moderated by their developing 'social brains'⁶
 - Temporal regions specialise early for processing social stimuli like faces and voices - in both HICs and low- and middle-income countries (LMICs)^{7,8}

AIMS Investigate 1) whether maternal responsiveness relates to later language in a LMIC setting, 2) the impact of infant neural selectivity for social stimuli on language development, 3) the interplay between maternal responsiveness and infant neural social selectivity in language development

METHODS A subsample ($N = 50$) was used from the Brain Imaging for Global Health (BRIGHT) project, a longitudinal study ($N = 204$) of neurocognitive development from birth to age two in rural Gambia.

12 months	<ul style="list-style-type: none"> • Maternal responsiveness assessed from 5-minute videos of mother-infant interactions using a novel coding scheme, capturing verbal (speech only), behavioural (actions without speech), and bimodal (speech and actions occurring together) responses. • Infants' auditory social selectivity (greater activation for human vocal sounds than environmental sounds) assessed in bilateral superior- and middle temporal gyri (STG-MTG) using functional near-infrared spectroscopy
24 months	<ul style="list-style-type: none"> • Language outcome assessed with: Mullen Scales of Early Learning MacArthur Bates Communicative Development Index Language Environment Analysis (LENA) System

ANALYSES

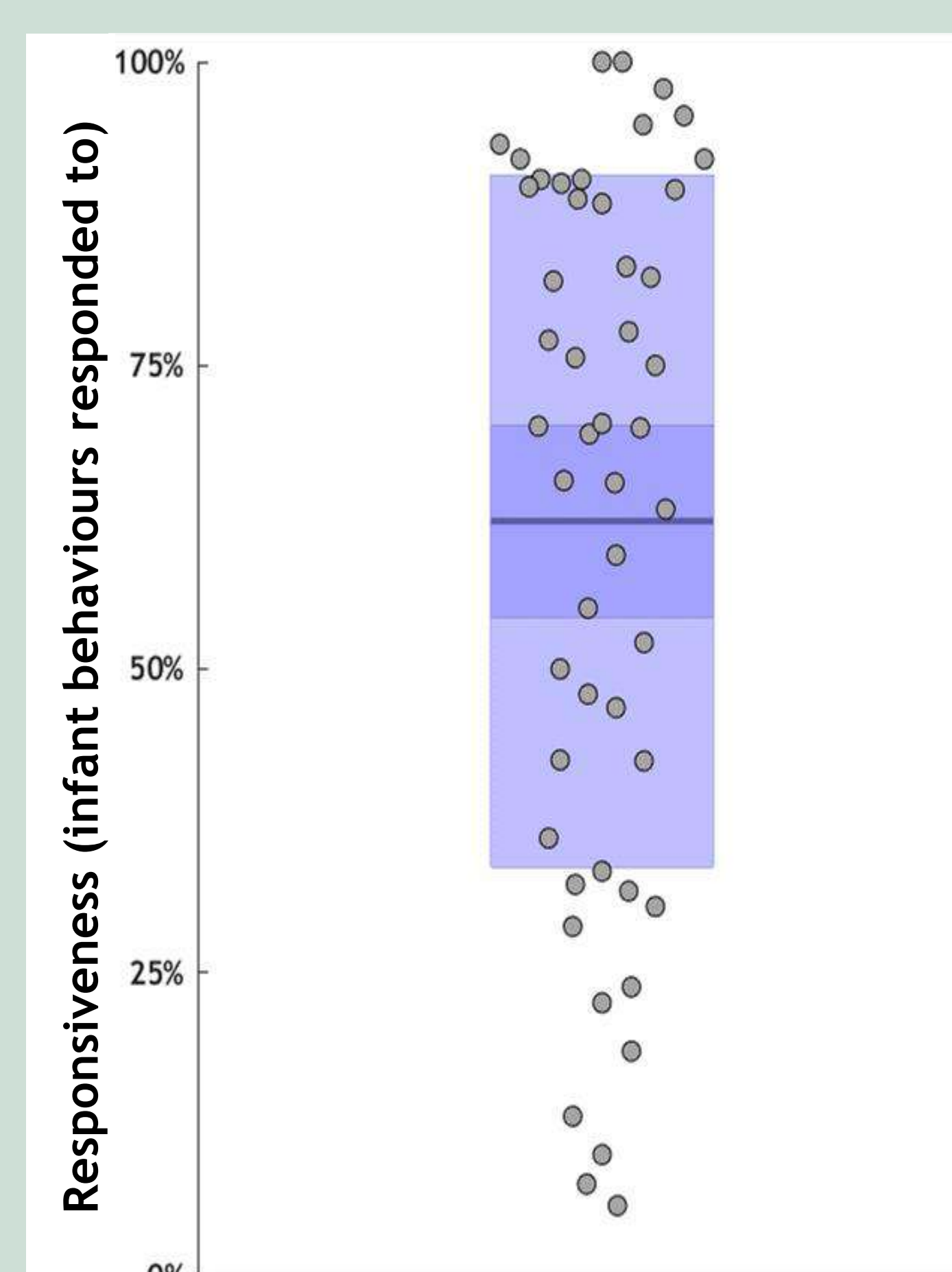
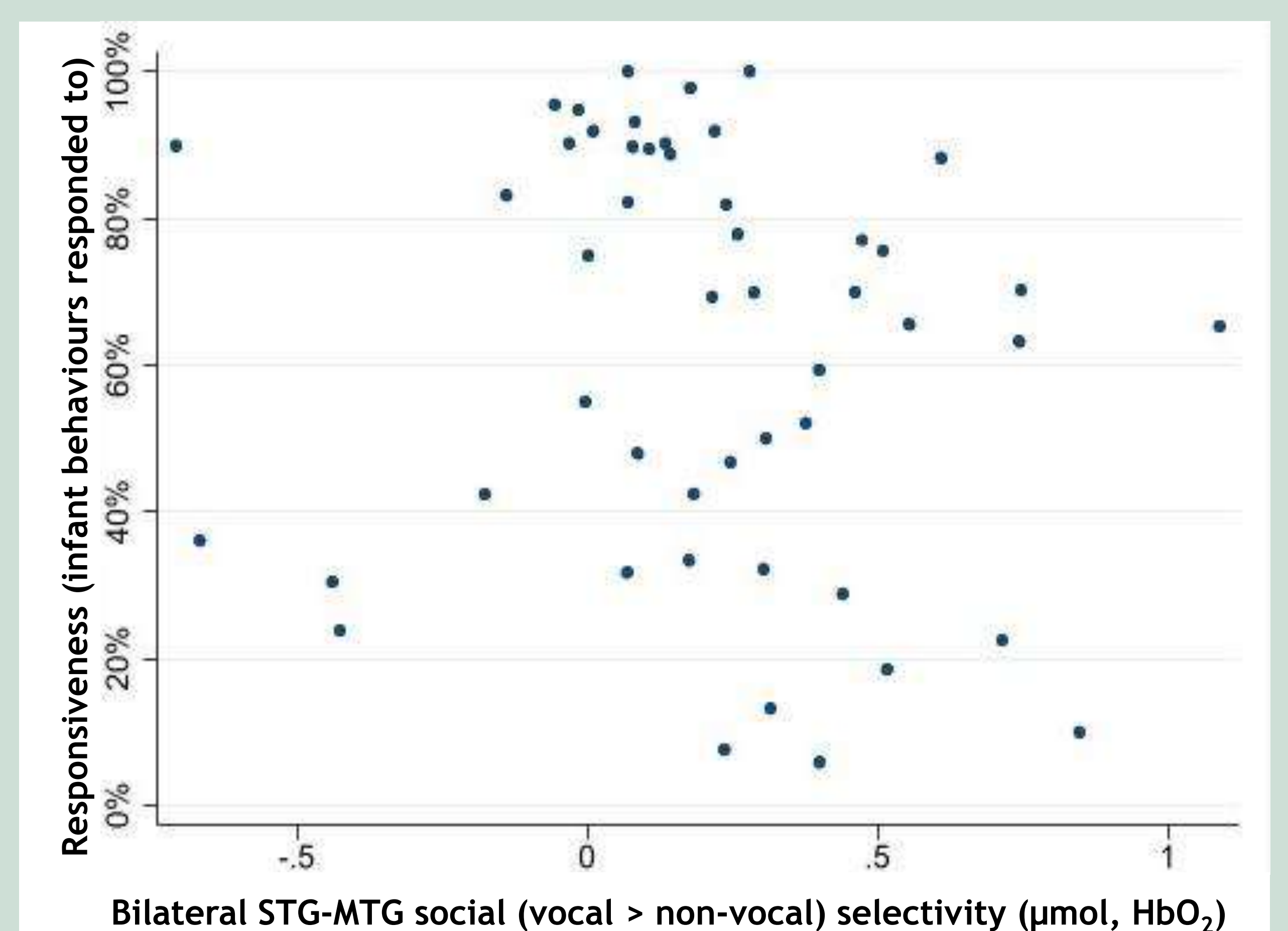
- Non-parametric correlation analysis between maternal responsiveness and infant auditory social selectivity
- Moderated multiple regression, controlling for infant gender and (non-verbal) cognitive development, with maternal responsiveness and infant auditory social selectivity as predictors of language outcome

RESULTS

- Mothers responded to $m = 62\%$ ($SD = 29\%$) of infant behaviours, with a wide range (6-100%) in the distribution of responsiveness
- Maternal responsiveness was **negatively associated** with infant auditory social selectivity, $r_s(48) = -.29, p = .043$
- Both maternal responsiveness and infant auditory social selectivity **did not predict** infant language outcomes
 - Infant auditory social selectivity also **did not moderate** the effect of responsiveness on language outcomes

DISCUSSION

- The complexities of extending links between parent behaviours and child development found in HICs to rural, LMIC settings. In some settings, other pathways may exist or more caregivers than mothers may be relevant
- The link between maternal responsiveness and positive child development might not be straightforward - both over- and under-contingency may be undesirable, with an intermediate level of responsiveness the most beneficial⁹
- These findings raise questions about our understanding of the magnitude of activation - with age, reduced magnitude of activation may reflect increased processing efficiency and/or more focal activation⁸



References

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