

The Bouba-Kiki Effect: Sound-Image Mapping in Autistic, Loss of Diagnosis, and Neurotypical Adolescents and Adults

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BACKGROUND

“Bouba-Kiki” = tendency to match words to shapes based on acoustic properties
Likely related to multisensory integration [1]
Reduced in autism [2]; unexamined in individuals who have lost the autism diagnosis (LAD)

This project aims to:

1. Assess sound-image mapping in autistic, LAD, & neurotypical (NT) participants
2. Examine associations with autism & sensory symptoms

METHODS

Autism = 16, LAD = 27, NT = 29 NT

- For 8 shape-nonword pairs, “which one do you think is [goga]?”
- Sensory Reactivity in Autism Spectrum [3] questionnaire (self-report)
 - Differentiates autism from NT
 - Cronbach’s alpha (subscales): 0.8-.93

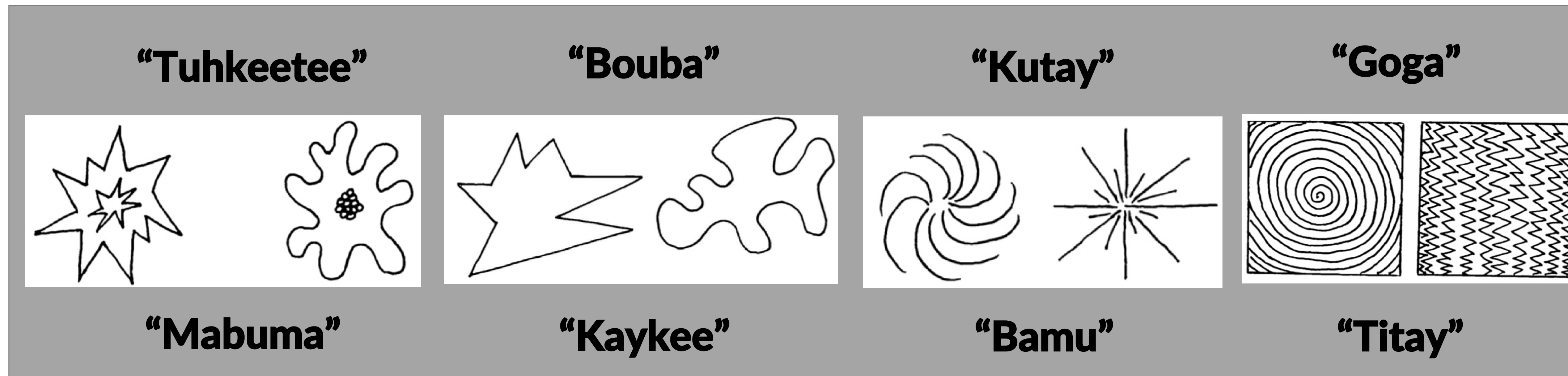
	Aut	LAD	NT	χ^2 or F	p
Gender (F:M:Other)	6:10:0	7:19:1	18:11:0	8.88	.06
Age (years)	21(5)	23(3)	23(7)	1.47	.24
ADOS CSS*	7(2)	2(1)	1(1)	110.3	<.001
PMAT	75(21)	83(17)	82(13)	1.02	.37
PVRT	60(22)	69(15)	66(18)	1.00	.37
Sensory Hypersensitivity	1.6(.5)	1.3(.7)	1.1(.4)	2.9	.06
Sensory Hyposensitivity	1.3(.5)	1.1(.6)	1.0(.5)	1.9	.15
Sensory Interests**	2.0(.6)	1.7(.8)	1.3(.7)	5.8	.005
Sensory-Motor	1(.6)	.8(.7)	.8(.8)	.6	.55

ADOS CSS=Autism Diagnostic Observation Schedule-2 Calibrated Severity Score
PMAT=Penn Matrix Reasoning Test, % correct
PVRT=Penn Verbal Reasoning Test, % correct

Sensory = Sensory Reactivity in Autism Spectrum questionnaire

* Aut > LAD & NT groups

** Aut > NT



LAD and NT: Shape/word matching above chance; NOT AUT

Failure to match = > sensory/motor scores in AUT & NT, but not LAD



RESULTS

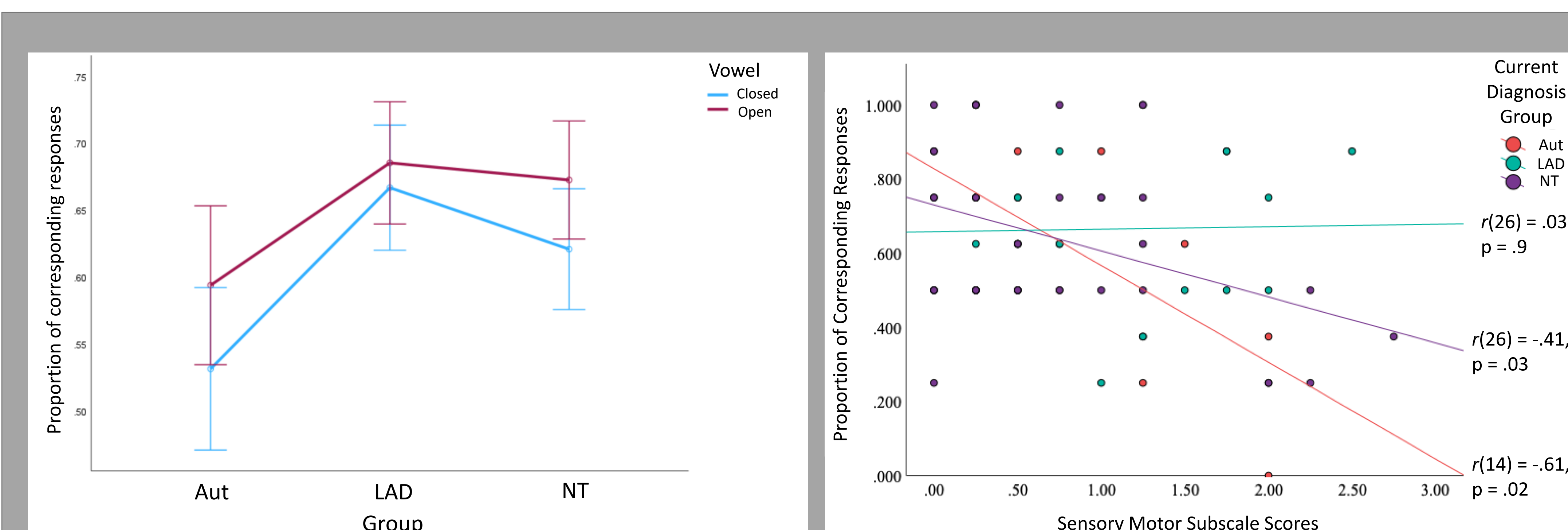
- Corresponding image chosen 63% overall
 - **Aut 56%: At chance**
 - $t(15) = .93, p = .37$
 - **LAD 68%: Above chance**
 - $t(26) = 4.57, p = <.001$
 - **NT 65%: Above chance**
 - $t(28) = 3.27, p = .003$
- No effect of vowel (open vs. closed)
- Negative association with sensory/motor symptoms for **AUT**, **NT**, but **NOT** **LAD**
- No association with autism symptoms or measures of sensory hypersensitivity, hyposensitivity, or interest

SENSORY MOTOR SCALE ITEMS

1. Clumsiness in everyday situations
2. Poor balance/bumping into things
3. Difficulty coordinating movements
4. Difficulty imitating movements

DISCUSSION/FUTURE DIRECTIONS

- Autism group did not show sound-image mapping above chance, whereas LAD and NT groups did
- Typical performance in LAD, but lack of association with sensory motor symptoms → compensation?
- Still collecting data – awaiting full autism sample
- Future work could include explicit measures of multisensory integration (i.e., temporal binding windows)



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[1] Peiffer-Smadja, N., & Cohen, L. (2019). The cerebral bases of the bouba-kiki effect. *NeuroImage*, 186, 679-689.

[2] Oberman, L. M., & Ramachandran, V. S. (2008). Preliminary evidence for deficits in multisensory integration in autism spectrum disorders: The mirror neuron hypothesis. *Social Neuroscience*, 3(3-4), 348-355.

[3] Elwin, M., Schröder, A., Ek, L., & Kjellin, L. (2016). Development and pilot validation of a sensory reactivity scale for adults with high functioning autism spectrum conditions: Sensory Reactivity in Autism Spectrum (SR-AS). *Nordic Journal of Psychiatry*, 70(2), 103-110. <http://doi.org/10.3109/08039488.2015.1053984>