

A Decade of Uncovering Physiological Responses in ASD: What it Tells Us & Where to Go from Here



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Autonomic response in autism spectrum disorder: Relationship to social and cognitive functioning

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Published: 03 July 2013

Relationship Between Respiratory Sinus Arrhythmia, Heart Period, and Caregiver-Reported Language and Cognitive Delays in Children with Autism Spectrum Disorders

Michelle A. Patriquin , Jill Lorenzi & Angela Scarpa

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Developmental Psychobiology

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Broad Implications for Respiratory Sinus Arrhythmia Development: Associations With Childhood Symptoms of Psychopathology in a Community Sample

ABSTRACT: Replicating the group-based developmental trajectory methodology from our prior study (Patriquin, Lorenzi, Scarpa, & Bell, 2014, *Developmental Psychobiology*, 56, 317-326), the current study examines the development of baseline respiratory sinus arrhythmia (RSA) across a new, larger cohort of typically developing children at 5, 10, 24, 36, and 48 months of age and examines the trajectory relationship with symptoms of childhood psychopathology. Group-based developmental trajectory modeling replicated our prior findings of a two-group model fit: a "High RSA" and "Low RSA" group. The "Low RSA" group, which demonstrated lower baseline RSA across all time

Developmental Psychobiology

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Developmental Trajectories of Respiratory Sinus Arrhythmia: Associations With Social Responsiveness





Biological Psychology

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Editorial

The biopsychology of autism spectrum disorder: Theory, methods, and evidence

[Bruce H. Friedman](#)  , [Angela Scarpa](#), [Michelle A. Patriquin](#)

Bulletin of the Menninger Clinic

A Journal for the Mental Health Professions

□ *Special Issue* □

EVIDENCE-BASED TREATMENT
AND CONCEPTUALIZATION OF
AUTISM SPECTRUM DISORDER



Menninger

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Evidence-based treatment and conceptualization of autism spectrum disorder: Emotion regulation, social impairment, and anxiety as targets

Michelle A. Patriquin, PhD, ABPP

The goal of this special issue is to highlight innovative evidence-based treatments and conceptualizations of emotion regulation difficulties, social impairment, and anxiety in autism spectrum disorder (ASD). The issue is organized into these three highly linked constructs. Targeting these constructs effectively will help to ensure positive outcomes for youth and adults with ASD. It is clear that continued research is needed that creatively addresses emotion regulation problems, social impairment, and anxiety in ASD. (Bulletin of the Menninger Clinic, 83[3], 199–204)



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“Much of our time in the broader world is lived with a certain amount of fear. Day-to-day life in a world built for neurotypical people can be like walking in a minefield. There are a lot of social rules that we don’t understand, and tremendous consequences inflicted on us for violating them.”

-Ari Ne’eman, *First Presidential Appointee with Autism*

First description of ‘autistic’ disturbances by Leo Kanner (1943):

“Everything that is brought to the child from the outside, everything that changes his external or even internal environment, represents a dreaded intrusion”



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Editorial

The biopsychology of autism spectrum disorder: Theory, methods, and evidence

Bruce H. Friedman  , [Angela Scarpa](#), [Michelle A. Patriquin](#)

ASD. By developing an understanding of neurophysiological differences in ASD, it is our hope that researchers, teachers, parents, and peers can use this perspective to appreciate the internal challenges individuals with ASD face and therefore provide opportunities to better reach and support individuals with ASD.



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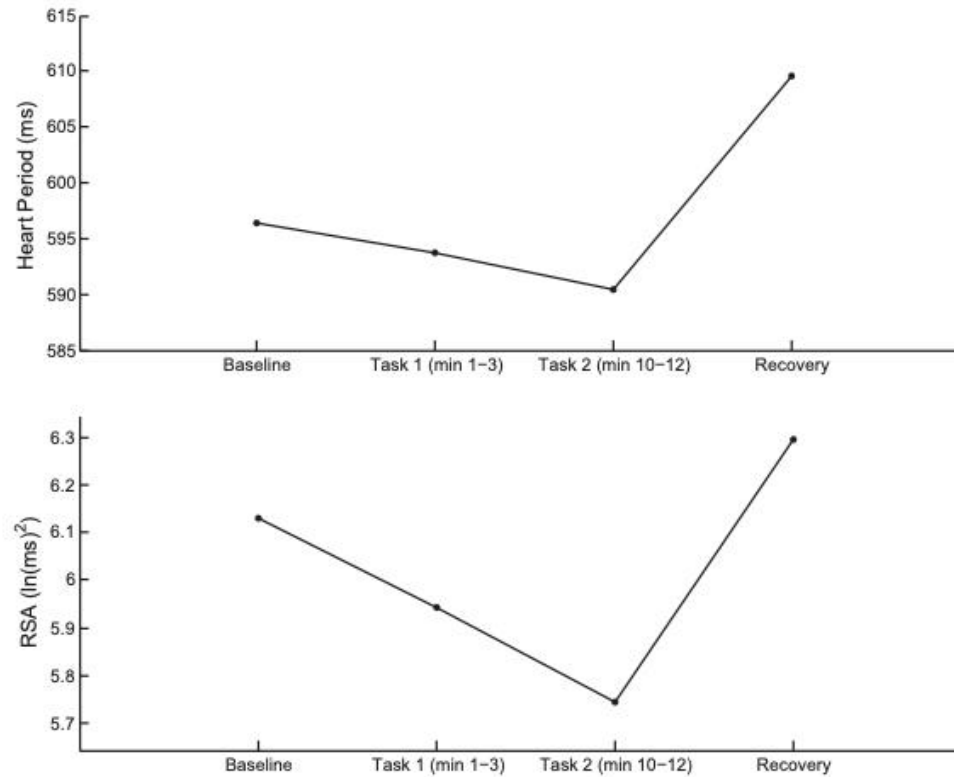
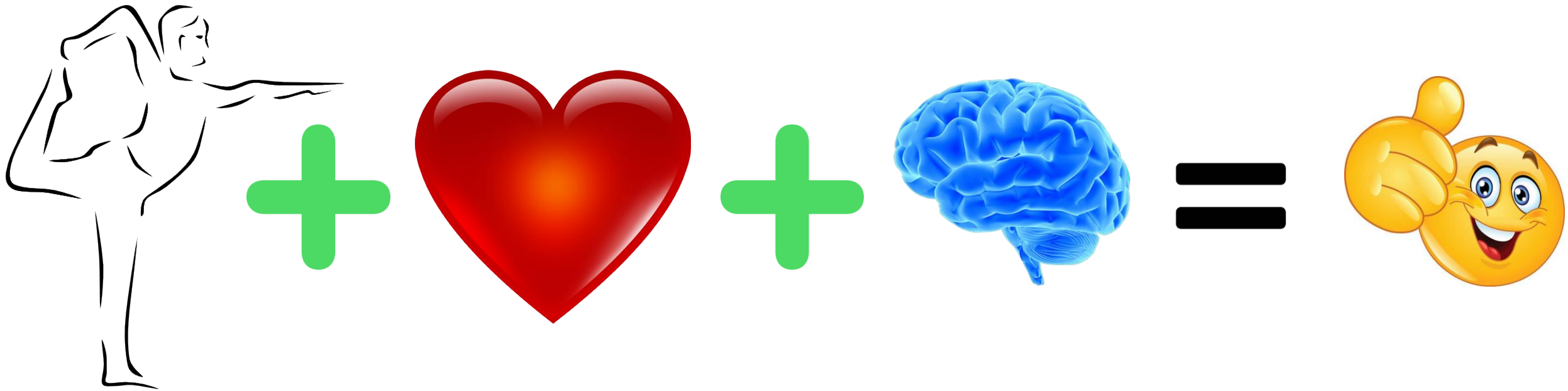


FIGURE 1 Change over time in respiratory sinus arrhythmia (RSA) and heart period.

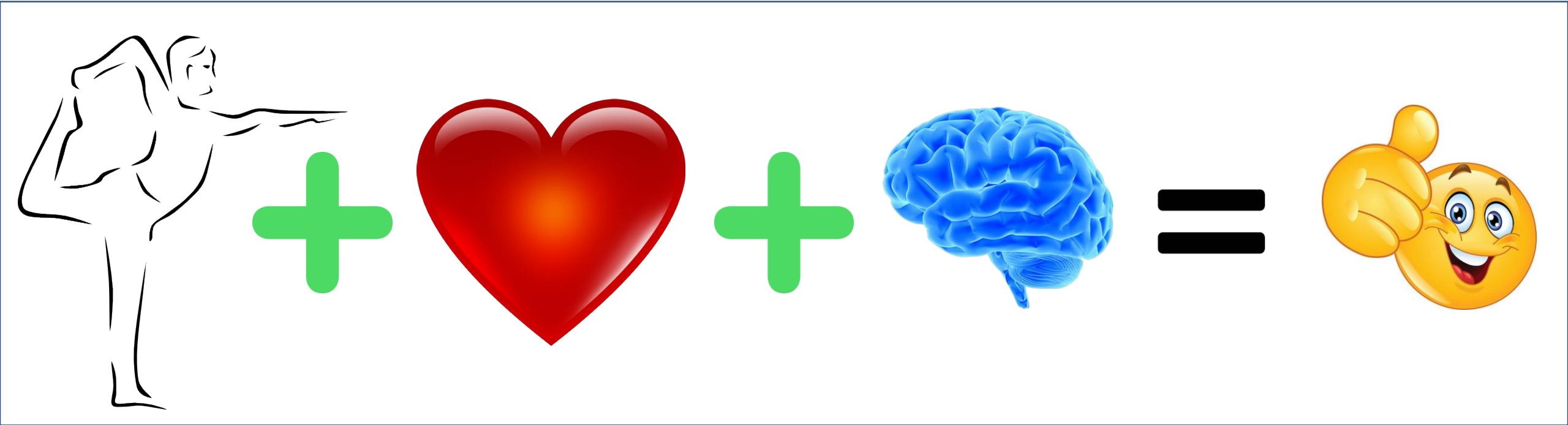
Repetitive Behaviors in ASD: Neurovisceral Integration



Repetitive Behaviors in ASD: Neurovisceral Integration

- Biological flexibility
 - Inflexible behaviors and cognition across ASD, OCD, and Tourette's/tic disorder
- Inflexibility within central and peripheral nervous system may be related to poorer outcome
- More biological inflexibility will be related to more restricted and repetitive behaviors

Biological Flexibility & Potential Outcomes



Developmental Trajectory of Autonomic Function





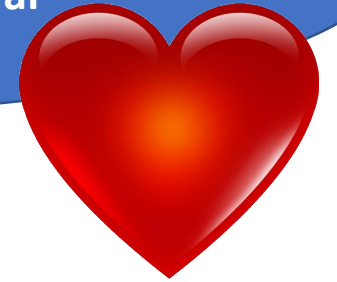
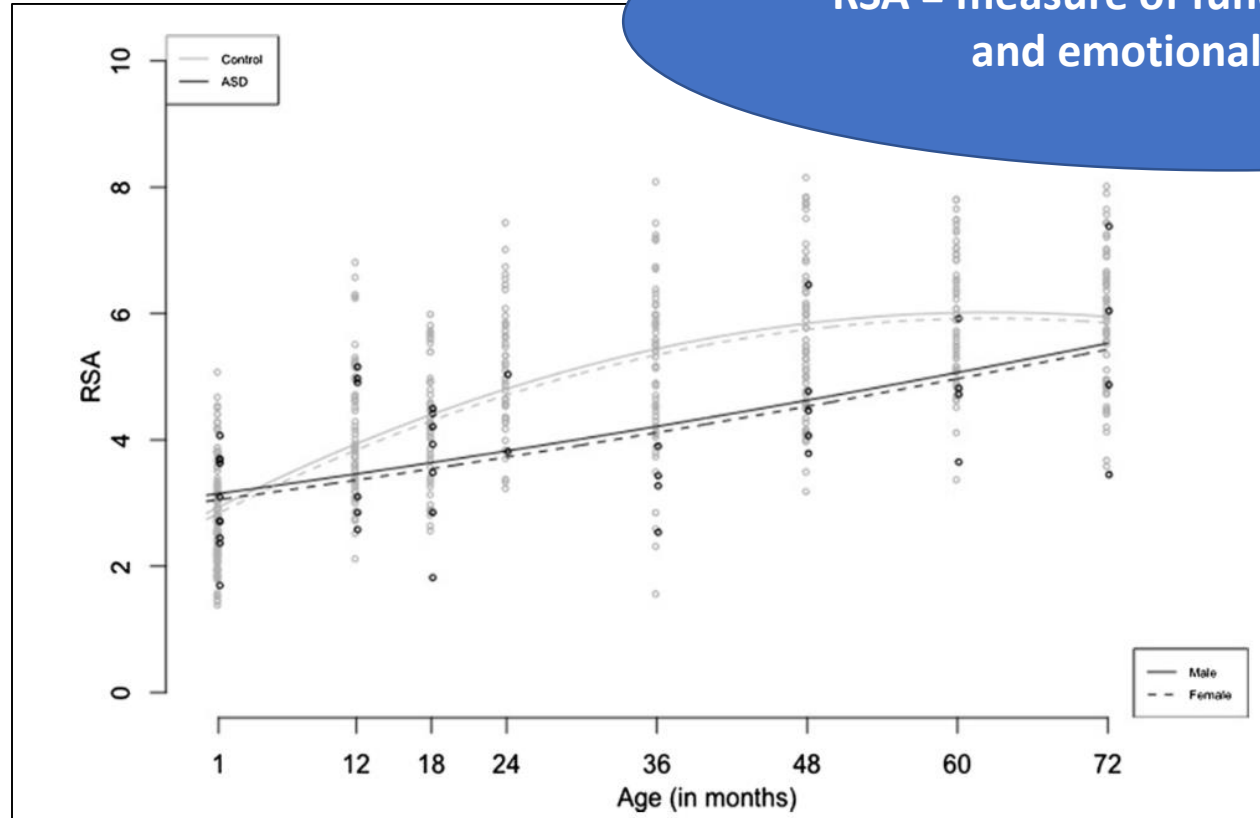
Developmental Trajectory



- Deficits in social engagement that emerge in ASD during the infant/toddler period may be related to emotion regulation and stress response growth
- Slower growth/development of RSA (HRV) compared to TD controls
- Differences in physiological regulation may develop with age in ASD
- Slowed HRV growth in ASD was most evident after 18 months – a time when symptoms become more prominent

Developmental Trajectory of Autonomic Function

RSA = measure of functioning; biological and emotional/behavioral



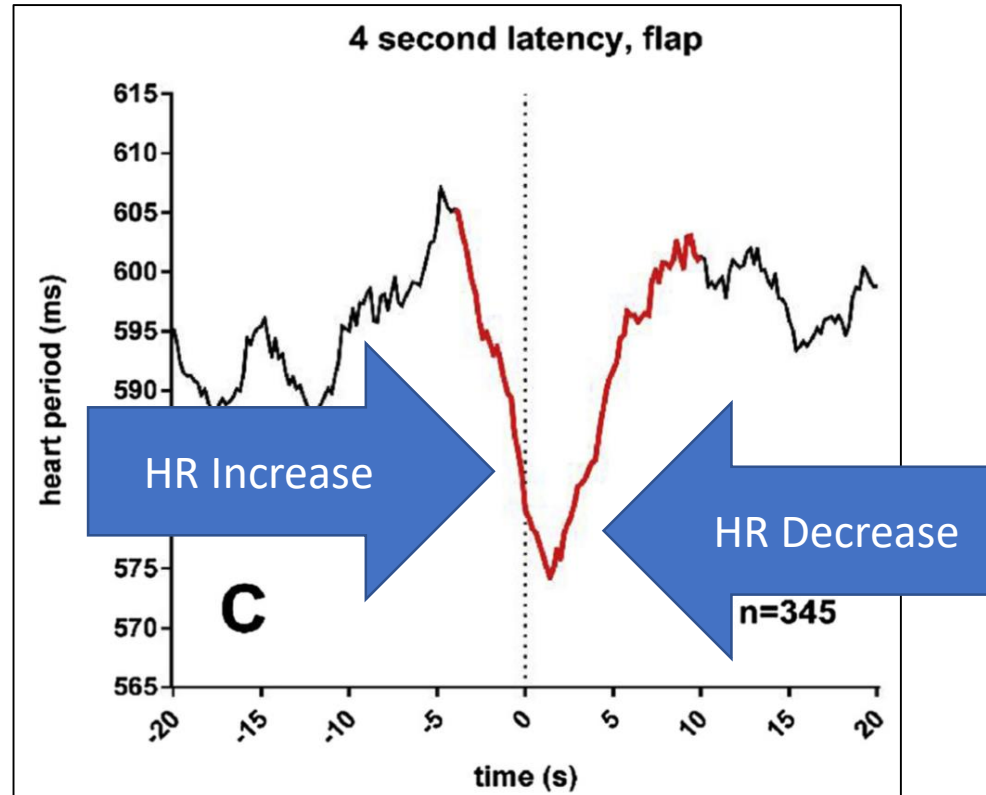
RRB & Cardiovascular Activity



RRB & Cardiovascular Activity

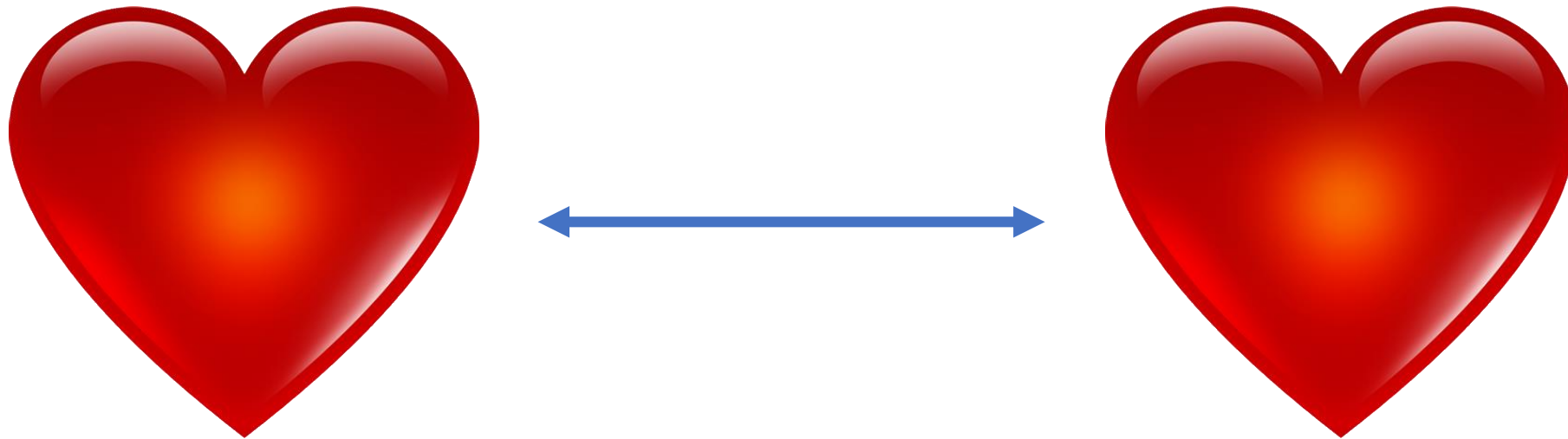
- RRB core diagnostic feature
- Homeostatic regulation function?
- HR changes occur with both repetitive body rocking and hand flapping in children and young adults with ASD
- Repetitive behaviors have cardiovascular coupling that occurs

RRB & Cardiovascular Activity



Synchronization of Physiological Response

- *Physiological linkage*: synchronization of physiological responses between interacting partners
 - Foundation for social reciprocity, a difficulty characteristic of ASD



Synchronization of Physiological Response

- Individuals with ASD do not show physiological linkages with their TD peers
- Establish a novel way to examine the biology support relationship dynamics and one that does not rely on observation and increases temporal specificity
- Adapting to others on a physiological level could impact social attunement and social relationships.



Heart + Behavior

Less physiological activation

More physiological activation



Fewer emotional
& behavioral difficulties

More emotional
& behavioral difficulties

Relevant for ASD, as well as potentially
other diagnoses (e.g., anxiety)

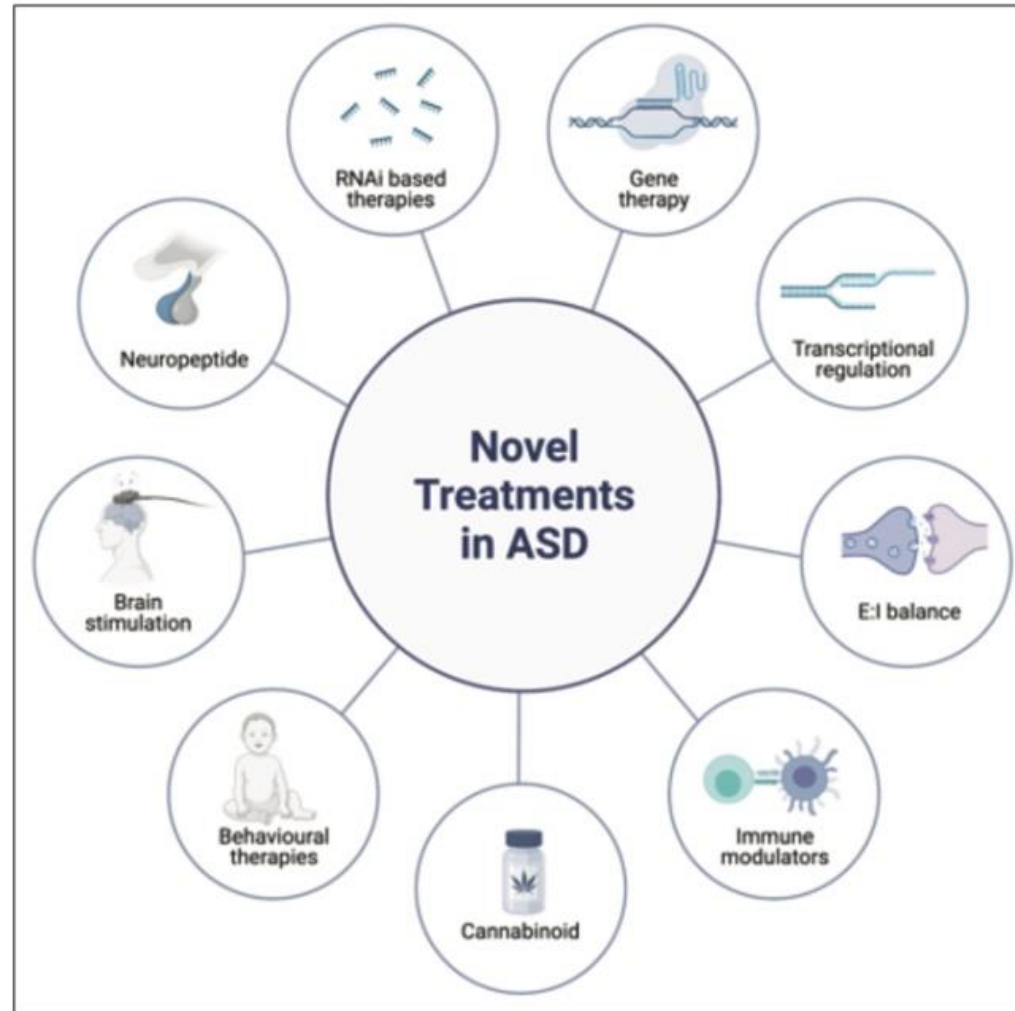


FIGURE 1. Potential novel treatments and treatment targets under investigation in autism. ASD, autism spectrum disorder; E:I, excitatory:inhibitory; RNAi, RNA interference.



Rene Anand · a year ago

Great article and like that autism is now defined by by more than behavior. Its possible that the changes in cardiac rhythms are due to alterations in the heart physiology itself, and not solely due to the autonomic inputs.

2 ^ | v · Reply · Share ›



Kristen Gorman · a year ago

Great article! It's funny, it often takes me a few seconds longer (compared to typical people) to process someone asking me a question or giving me a request. Autism research appears to suffer a similar delay- in developing hypotheses that relate to what autistic people have been saying for years. It's both encouraging and slightly frustrating to read that 'autism means additional stress and overwhelm' is now being addressed by researchers. I look forward to the (likely) confirmation that discrepancies between the baselines of the autonomic nervous system in NT folks and autists track with our own internal experiences. I also hope this could be a jumping off point for greater collaboration between autists and researchers who stand to benefit from our insights about ourselves.

5 ^ | v · Reply · Share ›



rosabw · a year ago

Yes. One can observe this. Just open your eyes!

1 ^ | v · Reply · Share ›

ILLUSTRATION BY
FEDERICA BORDONI

Getting at the heart of autism

Cardiac activity could reveal autism's physiology and confirm a hunch many clinicians share: that people with autism experience great stress.

“If a man does not keep pace with his companions, perhaps it is because he hears a different drummer.” – Henry David Thoreau (1854/1908, p. 245)

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