The Effects of Heart Rate Variability on Emotional Responding: Age Differences  
in Stigmatizing Images

# Producer notes

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# Special symbols

{ms} minus

{<} downwards arrow

{root} {/root} square root

{eta} small letter eta

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# The Effects of Heart Rate Variability on Emotional Responding: Age Differences in Stigmatizing Images

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{Logo: Université de Montréal}

{Logo: Université Concordia}

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## Prevalence of VI

* United States
  + 2.6 million from 18-44 = VI in one or both eyes
  + 3.7 million from 21-64 = Difficultly seeing words
    - Working age-adults
* Canada
  + Jutai (2005)
    - CNIB 2002
    - 18-49 = 15,813 LV
    - Half the numbers

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## Assistive Device Use in Older Adults

* Edward & Jones (1998)
  + 1405 elderly people aged over 65
  + 74% = more than one aid (spectacles, hearing aids, walking stick, non-slip bath mat, wheelchair)
  + 97% owned spectacles and 16% owned hearing aids.

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## Assistive Device Use in Younger Adults

* LaPlante and Colleagues (1992)
  + Specific assistive devices a significant proportion of participants were under the age of 25.
  + (wheelchair, white cane, hearing aid)
* 24 and under = 29% of participants used one these assistive devices
* 25-44 = 24% of participants used one these assistive devices.

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## Most of the time….

* Bateni & Maki (2005)
  + 69% of participants reported owning a wheelchair.
  + Only 27% of participants use their wheelchair.
  + Half the population = "Other reasons"

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## Stigmatization and Stereotyping

* Parette and Scherer (2004)
  + Abandonment of device
  + Vulnerable/jeopardizes social
* Scherer (2003)
  + Client in their 20's (hearing aid)

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## Stigma and Objective Measures

* Subjective/Objective
* Applelhans & Linda (2016); Jentengs, Beckers & Kindt (2013)
  + Physiological measures for emotional responding

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## Bridging the Gap

* Chalabev, Sarrazin & Brisswalter (2013)
  + HRV in response to stereotyping
  + Participants confronted with negative in-group and out-group scenarios
  + The results revealed that participants performed better after negative out-group stereotypes were unequivocally linked to performance compared to the control condition.

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## Current Study

* HRV and age relationship
* Emotional responding to stigmatizing photos
  + Ages ranging from 18-65+
* Young vs Elderly (Coudin & Alexopoulos, 2010)
* Hypothesis
  + Participants will have higher HRV when viewing images of young adults with assistive devices and less heart rate variability when viewing images of older individuals with assistive devices

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## Methods-Participants

* 20 participants (n=20)
* Between 18-30 years of age
* Undergraduate students from the Psychology Department at Concordia University

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## Methods-Materials

* **Measuring Heart RateVariability (HRV):**
  + IR heart-rate sensor on left finger
  + Infra-red photoplethysmography pulse-wave sensor plugged into an Arduino Uno board
  + Custom code for amplifying and detecting raw heart rate (sample rate of 1000Hz)

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## Methods-Photo Stimuli

**Young (18-35)**

* With device  
  {Illustration not described}
* Without device  
  {Illustration not described}

**Old (65+)**

* With device  
  {Illustration not described}
* Without device  
  {Illustration not described}

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## Methods-Measures

* **Expectations Regarding Age (ERA)**
  + Sample question: "Quality of life declines as people age"
  + Likert scale: 1-4
* **Explanatory Model Interview Catalogue (EMIC)**
  + Sample question: "Would others refuse to visit the home of a person who uses assistive device?"
  + Yes = 2, Possibly = 1, No = 0 and I don't know = 0

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## Data Analysis

* 2×2 repeated measures ANOVA
* 2 Independent variables
  + Device
  + Age
* 5 dependent variables
  + Mean RR, STD RR, Mean HR, STD HR and RMSSD (Root Mean Square of Successive Differences)
* Correlational Analysis
  + Questionnaire scores & Dependent Variables.

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### Variables-Mean RR and STD RR

#### Frequency-domain

How are the RR intervals modulated?  
{Illustration not described or reproduced}

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### Variables-Mean HR and STD HR

#### Time-domain

How many heartbeats in this timeframe?  
{Illustration not described or reproduced}

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### Variables-RMSSD (Root Mean Squared of Successive Differences)

RR Interval  
{Illustration not described}

{<}

(RR Interval 1 {ms} RR Interval 2)²  
+  
(RR Interval 2 {ms} RR Interval 3)² ...  
{Illustration not described}

{<}

{root}mean of above{/root} = RMSSD

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### Descriptive Statistics – Participants

* Mean Age and Range: 23 years old (18-27)
* Gender: 1 Male, 19 Females
* Race: 11 NW, 9W
* Other Descriptives: 2 participants reported panic attacks and anxiety

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### ANOVA-MRR

F(1, 18) = .057, p = .814, {eta}² = .003  
{Chart not described}

The ANOVA showed that participants Mean RR did not differ significantly when viewing images of Old and Young individuals with, and without an assistive device.

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### ANOVA-MHR

F(1, 18) = .850, p = .369, {eta}² = .045  
{Chart not described}

The ANOVA showed that participants Mean HR did not differ significantly when viewing images of Old and Young individuals with, and without an assistive device.

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### ANOVA-RMSSD (Root Mean Sqaured of Successive Differences)

F(1, 18) = .035, p =.855, {eta}² = .002  
{Chart not described}

The ANOVA showed that participants RMSSD did not differ significantly when viewing images of Old and Young individuals with, and without an assistive device.

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### Correlational Analysis-Emic

Mean\_RR\_Dv\_OI  
{Chart not described}

* r(19) = .123, p = .606

Mean\_RR\_Dv\_Yo  
{Chart not described}

* *r*(18) = .044, *p* = .858

Mean\_RR\_Nd\_OI  
{Chart not described}

* *r*(19) = .110, *p* = .643

Mean\_RR\_Nd\_Yo  
{Chart not described}

* *r*(19) = .353, *p* = .127

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### Correlational Analysis-EMIC

RMSSD\_Dv\_OI  
{Chart not described}

* *r*(19) = {ms}.176, *p* =.458

RMSSD\_Dv\_Yo  
{Chart not described}

* *r*(18) = {ms}.307, *p* = .201

RMSSD\_Nd\_OI  
{Chart not described}

* *r*(19) = {ms}.247, *p* = .293

RMSSD\_Nd\_Yo  
{Chart not described}

* *r*(19) = .128, *p* = .590.

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### Correlational Analysis-ERA

Mean\_RR\_Dv\_OI  
{Chart not described}

* *r*(19) = {ms}.003, *p* = .991

Mean\_RR\_Dv\_Yo  
{Chart not described}

* *r*(18) = {ms}.040, *p* = .871

Mean\_RR\_Nd\_OI  
{Chart not described}

* *r*(19) = {ms}.065, *p* = .785

Mean\_RR\_Nd\_Yo  
{Chart not described}

* *r*(19) = .027, *p* = .911

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### Correlational Analysis-ERA

RMSSD\_Dv\_OI  
{Chart not described}

* *r*(19) = {ms}.025, *p* =.916

RMSSD\_Dv\_Yo  
{Chart not described}

* *r*(18) = {ms}220, *p* = .365

RMSSD\_Nd\_OI  
{Chart not described}

* *r*(19) = {ms}.143, *p* = .548

RMSSD\_Nd\_Yo  
{Chart not described}

* *r*(19) = {ms}.132, *p* = .580.

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## Discussion

* Participants did not find these images to be stigmatizing
  + … is this a good thing?
  + Possibly due to the advance in technology
    - Rojas-Mendez, Parasuraman & Papadopoulos (2015)

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## Limitations / Future Direction

* Small sample size
* Cut off score for EMIC?
  + Total possible score is 30
* Participant Variability
* Older participants?

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**THE END**