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# Words May Assess Implicit Attitudes About Fluent & Stuttered Speech

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# Abstract

- Past research regarding attitudes about people who stutter (PWS) has generated a wealth of knowledge from explicit methods of data collection like Likert scales, semantic differential scales, and open ended questionnaires. The addition of a word based implicit measure of attitudes like an Implicit Association Test (IAT) may complement the explicit knowledge the field already possesses. This study involved 66 PWDS performing a Word IAT (implicit measure of attitude) and three Explicit Measures of attitudes toward stuttering. Results indicate that most of the participants displayed strong implicit associations toward fluent speakers (negative associations toward stuttering speakers) while their explicit attitudes seemed to be warm toward both PWS and PWDS. Future studies will target diverse populations with a web based version of the current Word IAT and explicit questions. Also, future studies will use implicit and explicit measures to target populations whom come in contact with PWS (employers and educators). Finally PWS of all ages and diversity could perform the above measures of attitudes in order to compare their attitudes with PWDS.



# *Background – Explicit Measures*

The use of explicit methodologies like listing adjectives, likert scales, and semantic differential scales has played a vital role in producing data from a variety of populations with PWS and PWDS .

- First, the methodology of asking participants to list adjectives or think of words associated with explicit attitudes about stuttering can be most credited to Yairi and Williams (1970) who gathered 26 commonly listed traits from speech pathologists used to describe a boy who stuttered (17 were seen as undesirable).
- Other research from Lass and Ruscello (12;13;20;21) in the 80s and 90s used this same method of listing traits associated toward hypothetical PWS with a large variety of education personnel and college students. The majority of the studies indicated that participants in academic settings appear to list more negatively viewed traits about PWS than positive traits.



# Back ground – Semantic Differential Scales

- The use of the semantic differential scale (18) to research attitudes toward stuttering was developed by Woods and William (1976) who used 25 of the traits from Yairi and Williams (1970) to create a seven point bi-polar word scale (e.g., Sociable to Unsociable). The results from their study indicated that the participants (who all did not stutter AND in some way had contact with children who stutter) viewed PWS differently than PWDS.
- Semantic differential scales have been used with a large variety of populations and settings (2; 3; 4; 9; 23). These studies mostly have noted that PWDS appear to develop more negative perceptions toward PWS.



# *Background – Implicit Association Tests*

Implicit Association Test are:

“A response latency measure that rests on the assumption it shares with other measures of associative strength that the more strongly two concepts have come to be associated with one another, the faster and more accurately they can be paired together”. (1; p. 54).

IATs are indirect measures of social cognition in order to examine cognitive personality and social behavior (7) which has been shown to have predictive validity with respect to stereotyping and prejudice (16;19).

An IAT might be a great addition to the stuttering attitude research because “people might be unwilling to report some of their attitudes or stereotypes because they do not like having them” (17; p. 22) and people may be expressing more socially appropriate answers than their “true private opinions” (5; p. 209)



# *Need for Implicit Measures of Attitudes*

Explicit research studies which have involved such methodology as semantic differential scales and listing adjectives to describe stuttering have been the dominant tools for collecting data with regards to stereotypes toward PWS. However, there are limitations to only focusing on explicit measures of attitudes people possess.

Recently Irani and Gabel (2008) used a semantic differential scale with school teachers and found that they perceived both fluent and stuttering speakers positively and that experience teaching and with people who stutter did not appear to have an impact on attitudes toward PWS which is not congruent with past research.

The above research (10) is just one recent study that may indicate that there maybe a need for the development of an implicit measure to compliment explicit measures in the attempt to attain the full picture of what attitudes look like from participants' perspectives.

The primary need for an implicit measure is that explicit measures do not address the “unconscious needs and drives of an individual” (14).



# Design – IAT

Participants were asked:

- to place their middle or index fingers on the E and I keys of the keyboard. Words representing the categories of **Stuttering Speaker** and **Fluent Speaker (Target Concepts)** a long with **Good** and **Bad (Attribute Concepts)** will appear in the top left and right corners of their monitor.
- to sort words as fast they could (with the E and I keys) while making as few mistakes as possible.

IATs have seven stages for a total of 180 trails (only stages 3,4, 6,7 were used for data collection for a total of 120 testing trials).





## Instructions Page – Between Each

Stage

Stuttering Speaker

Fluent Speaker

Put your middle or index fingers on the E and I keys of your keyboard. Words representing the categories at the top will appear one-by-one in the middle of the screen. When the item belongs to a category on the left, press the E key; when the item belongs to a category on the right, press the I key. Items belong to only one category. If you make an error, an X will appear - fix the error by hitting the other key.

This is a timed sorting task. GO AS FAST AS YOU CAN while making as few mistakes as possible. Going too slow or making too many errors will result in an uninterpretable score. This task will take about 5 minutes to complete. For best results, avoid distractions and stay focused.

Press the SPACE BAR to begin.

## Practice Stage 1 – 20 Trials

(Targets)  
Stuttering Speaker

Fluent Speaker

Choppy

## Practice Stage 2 – 20 Trials

(Attributes)

Good

Bad

Lovely

## Test Stages 3/4 – 20/40 Trials (Targets and Attributes)

Stuttering Speaker

Fluent Speaker

or

or

Good

Bad

Stumble



# Practice Stage 5– 20 Trials (Counter Balanced Targets)

# Test Stages 6/7 – 20/40 Trials Counter Balanced Target & Regular Attributes

Fluent Speaker

Stuttering Speaker

Smooth

Fluent Speaker

Stuttering Speaker

or

Good

Bad

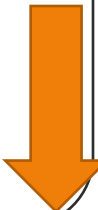
Painful

## Feedback of Score IAT

Score

Your IAT score (D) was -0.30, which suggests a slight automatic preference for Stuttering Speaker compared to Fluent Speaker.

Press the spacebar to complete this session.



# Design – Explicit Attitude Questions

The following explicit attitude questions were asked in order to gain explicit attitude knowledge with the degree of “Warmth” toward PWS and PWDS and preference toward speaking with PWS and PWDS.

**How warm or cold do you feel toward Fluent Speakers?**

**How warm or cold do you feel toward Stuttering Speakers?**

Participants were then given a drop down menu with:

**0= *Very Cold*, 5= *Neural*, 10= *Very Warm***

**Which statement best describes you?**

Participants were then given a drop down menu with:

**1= *I strongly prefer fluent speakers to stuttering speakers.***

**2= *I moderately prefer fluent speakers to stuttering speakers.***

**3= *I slightly prefer fluent speakers to stuttering speakers.***

**4= *I like fluent speakers and stuttering speakers equally.***

**5= *I slightly prefer stuttering speakers to fluent speakers.***

**6= *I moderately prefer stuttering speakers to fluent speakers.***

**7= *I strongly prefer stuttering speakers to fluent speakers.***



# Explicit Attitudes Questions and Familiarity Questions Post IAT

1). Which statement best describes you?

2). Do you know someone who stutters?

- Yes
- No

3). If you know someone who stutters, what relation are they do you?

- Friend
- Father
- Mother
- Sibling
- Classmate
- Coworker
- Other
- Myself
- I don't know someone who stutters

4). How warm or cold do you feel toward fluent speakers?

5). How warm or cold do you feel toward stuttering speakers?

Next



# Demographics

66 college participants

Mean age of 19 (S.D. 1.1 years of age)

62% Female

72.7% reported knowing someone who stuttered (most common was a “Friend”) and 16% of these people knew more than one PWS

Majors (most frequently reported):

- 18.2% Education
- 12.1% Communication Disorders
- 7.6% Sports Management
- 7.6% Business
- 4.5% Criminal Justice
- 4.5% Visual – Communication Technology

Race:

- 80% Caucasian
- 14% African American
- 2% Latino
- 4% Other or Mixed



# Analysis

## Word IAT (Implicit Measure):

- A Cohen's D Effect Size Analysis was used to determine the IAT Effect which indicated strength of association for each participant (using stages 3,4, 6,7 reaction time latencies).

IAT Effect (Cohen's D)	Strength of Association
Great than or equal to .65	Strong Association Toward Fluent Speakers
Great than .35	Moderate Association Toward Fluent Speakers
Greater than .15	Slight Association Toward Fluent Speakers
Between -.15 and .15	Little to no Association Toward Fluent or Stuttered Speakers
Less than -.15	Slight Association Toward Stuttering Speakers
Less than -.35	Moderate Association Toward Stuttering Speakers
Less than or equal to -.65	Strong Association Toward Stuttering Speakers

- MANOVA & ANOVAs were used to examine differences with independent variables of **Gender**, and **Familiarity** of Stuttering (**Knowing Someone Who Stutters or Do Not Know Someone Who Stutters**)

## Explicit Measures:

-Pearson's R correlations were conducted to investigate the relationship between the three explicit attitude questions.

-MANOVAs and ANOVAs were conducted with independent variables of **Gender**, and **Familiarity** of Stuttering (**Knowing Someone Who Stutters or Do Not Know Someone Who Stutters**)

## Relationship of Implicit and Explicit Measures:

Pearson's R correlations were conducted to investigate the relationship between the Word IAT (**IAT Effect**) and explicit measures (**preference to stuttering and fluent speakers, warmth toward fluent speakers, and warmth toward stuttering speakers**).



# Results - Word IAT

Frequency Analysis of Word IAT Strength of Association Scores of the 66 Participants:

- 83.3% displayed STRONG Associations Toward **Fluent** Speakers
- 9.1% displayed MODERATE Associations Toward **Fluent** Speakers
- 1.5% displayed EQUAL Associations Toward Both **Fluent** and **Stuttering** Speakers
- 1.5% displayed STRONG Associations toward **Stuttering** Speakers

ANOVA revealed **significant** main effects between Compatible and Incompatible Trials ( $F(1, 7918) = 1091.808, p < .001, \text{partial } \eta^2 = .121, \text{observed power} = 1.000$ ).

ANOVA revealed **no significant** effects of the independent variable **Gender** on the **Word IAT Effect**, ( $F(1, 64) = .396, p = .532, \text{partial } \eta^2 = .006, \text{observed power} = .095$ )

ANOVA revealed **no significant** effects of **Knowing Someone Who Stutters** on the **Word IAT Effect** ( $F(1, 64) = .226, p = .636, \text{partial } \eta^2 = .004, \text{observed power} = .075$ )

MANOVA revealed **no significant** interaction effects for **Gender** and **Knowing Someone Who Stutters** were shown with the **Word IAT Effect**, ( $F(1,66) = 2.858, p = .096, \text{partial } \eta^2 = .044, \text{observed power} = .384$ )



**Summary of Means and Standard Deviations of Raw Latencies for 20 and 40 Trials Compatible and Incompatible Stages on the Word IAT**

Stages	Word IAT <sup>a</sup>	
	Mean	Std. Deviation
<b>Compatible -20 Trails Stage</b>	799.9	377.264
<b>Compatible -40 Trails Stage</b>	737	332.322
<b>Incompatible -20 Trails Stage</b>	1322	716.833
<b>Incompatible -40 Trails Stage</b>	1052	582.873
<b>Total</b>	950.1	552.049

<sup>a</sup>N=7920

**Summary of Means and Standard Deviations for Effects of Gender on Implicit Measure of the Word IAT**

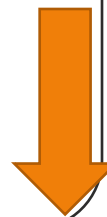
Dependent Variable	Female			Male		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
<b>Word IAT Effect</b>	0.82058	0.305113	41	0.87355	0.372019	25

**Summary of Means and Standard Deviations for Effects of Knowing Someone Who Stutters on Implicit Measure of the Word IAT**

Dependent Variable	Knows Someone Who Stutters			Does Not Know Someone Who Stutters		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
<b>Word IAT Effect</b>	0.82874	0.30487	48	0.87239	0.39819	18

**Summary of Means and Standard Deviations for Interactions of Gender and Knowing Someone who Stutters on Implicit Measures**

Dependent Variable	Knows Someone Who Stutters				Does Not Know Someone Who Stutters			
	Female		Male		Female		Male	
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
<b>Word IAT Effect</b>	0.8371	0.24144	0.817	0.3832	0.785	0.42089	1.09962	0.230306





# Results - Explicit Measures and Correlations with Word IAT

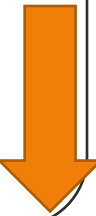
Pearson's R Correlations revealed :

- **significant negative correlation** between participants' explicit **preference toward PWS and PWDS** and their **warmth toward PWS** [ $r^2(64) = -.269, p = .029$ ]
- **significant positive correlation** between participants explicit **preference toward PWS and PWDS** and their **warmth toward PWDS** [ $r^2(64) = .291, p = .018$ ]
- **significant positive correlation** between participants reporting their **warmth toward PWS** and their **warm toward PWDS** [ $r^2(64) = .400, p = .001$ ]
- **No significant correlations** with any **Explicit Measures** and the **Word IAT**.

MANOVA and ANOVA results found **no significant** effects of **familiarity** (Knowing Someone Who Stutters or Not) on any of the **Explicit Measures**

MANOVA revealed **significant** effects of **Gender** with **combined Explicit measures** ( $F(1, 64) = 2.310, p = .134, \text{partial } \eta^2 = .035, \text{observed power} = .322$ )

- Follow up ANOVAs revealed
  - **No significant** effects of **Gender** on **preference toward PWS**
  - **No Significant** effects of **Gender** on **PWDS and warmth toward PWS**
  - **Significant** Effects of **Gender** on **warmth toward PWDS** was found ( $F(1,64) = 10.935, p = .002, \text{partial } \eta^2 = .146, \text{observed power} = .903$ )



## Summary of Means and Standard Deviations for Effects of Knowing Someone Who Stutters on Explicit Measures

Dependent Variable	Knows Someone Who Stutters			Does Not Know Someone Who Stutters		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Preference toward Fluent or Stuttering Speaker	2.46	0.977	48	2.04	1.274	18
Warmth Toward PWS	8.29	2.04	48	7.64	1.912	18
Warmth Toward PWDS	6.56	1.885	48	5.12	1.394	18

## Summary of Means and Standard Deviations for Effects of Gender on Explicit Measures

Dependent Variable	Female			Male		
	Mean	Std. Deviation	N	Mean	Std. Deviation	N
Preference to Fluent or Stuttering Speaker	2.46	0.977	41	2.04	1.274	25
Warmth Toward PWS	8.29	2.04	41	7.64	1.912	25
Warmth Toward PWDS	6.56	1.885	41	5.12	1.394	25



## Summary of Means and Standard Deviations for Interactions of Gender and Knowing someone who Stutters on Explicit Measures

Dependent Variable	Knows Someone Who Stutters		Does Not Know Someone Who Stutters					
	Female	Male	Female	Male				
	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Preference to Fluent or Stuttering Speakers	2.5	0.923	2.05	1.276	2.38	1.121	2	1.414
Warmth Toward PWS	8.29	2.123	7.75	1.888	8.31	1.932	7.2	2.168
Warmth Toward PWDS	6.43	1.913	5.2	1.508	6.85	1.864	4.8	0.837

## Correlations of Implicit and Explicit Measures

	Preference toward Fluent or Stuttering Speaker	Warmth Toward PWS	Warmth Toward PWDS
Warmth Toward PWS	-.269*		
Warmth Toward PWDS	.291*	.400**	
Word IAT Effect	0.016	-0.135	-0.046

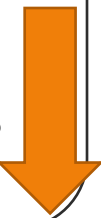
N = 66 for above Correlations



## *Discussion – IAT (What are they telling us?)*

IATs have been suggested to be indicators of negative or positive **ACCEPTANCE** toward social groups and **PREDICTORS OF SOCIAL BEHAVIOR** like “social judgment, physical responses, social action” (8;11;19). Also IATs appear to be more effective than explicit measures when increased socially sensitive topics are addressed (15), not unlike stuttering.

This Word IAT maybe measuring associations or bias toward fluent and stuttered **SPEECH** and **not** toward fluent and stuttering **SPEAKERS** (as the Target Concepts represented). Further studies with personality adjectives (from past research) maybe needed to compare IAT Effects with the speech behavior adjectives from this study.



## *Discussion – Explicit Results and Correlations with Word IAT*

The only significant finding for both implicit and explicit measures was that Females display more warmth toward PWDS than males which is consistent with past research about empathy toward cultural differences (22)

All explicit measures appeared to significantly correlate with each other which may indicate that what participants may “want to be unbiased” toward both PWS and PWDS.

However, low non significant correlations were found with the Word IAT and the explicit measures which is consistent with past research in a large variety of other disciplines who used IATs and explicit measures(11). This finding may further support the dual processing model of implicit and explicit attitudes (24) and the MODE Model (6).



# Limitations and Future Studies

One limitation is that the explicit measures always followed the Picture IAT, there is no way to determine if this construct created an order effect; however future studies will randomly assign the order of implicit and explicit measures to participants.

Many IAT studies are performed online in order to generate large sample sizes from diverse populations. Future studies will be conducted online to address the lack of ethnic diversity that this study displayed.

Performing IATs with **employers and coworkers** along with **teachers and education professionals** (like past explicit attitudes research toward PWS) may compliment the wealth of research in these areas with respect to stereotypes and social judgments. Other populations like **adolescents** and **school aged child** IATS might generate some interesting data when compared to IATs performed by parents and teachers. With all of these population, **PWS could perform IATs** in an effort to assess their implicit attitudes as compared to PWDS.

Future studies with new adjectives that are more “**personality**” type **words** may find differences of Implicit attitudes than the “**speech behavior**” words used in this study.

Changing the Target concepts (i.e., Stuttering Speaker and Fluent Speaker) and the Attribute Concepts (i.e., Good and Bad) may generate different IAT Effects (e.g., change Target Concepts to “Stuttering Speaker” and “Disability” or change Attribute Concepts to “like” and “dislike”).



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Thank You!