

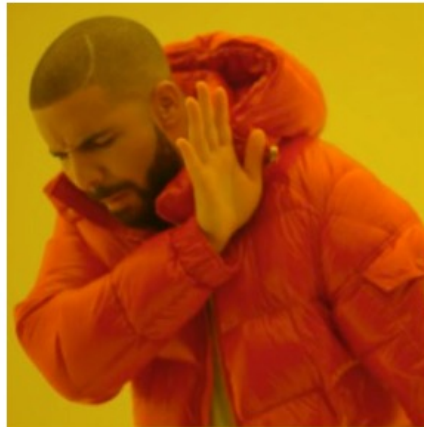
Emotional Tone Embedded in Leadership Items and Memory Processing

IMPLICATIONS FOR LEADERSHIP MEASUREMENT

Mengying Li, Bryan Acton

**Bernard M. and Ruth R. Bass Center for Leadership Studies
School of Management | State University of New York at Binghamton**

Self-Report Questionnaires



Leadership ratings are based on leader behaviors.



Leadership ratings are general schemas or liking.

Lord et al., 1985, 2020; Yammarino et al., 2020

Response Process Validity

**Measurement
Intention**

**Memory
Source**



Episodic



Semantic

Borsboom et al., 2004; Cronbach & Meehl, 1955; Hughes, 2018; Tulving 1983, 1985, 2002

Episodic-Semantic Memory Paradigm

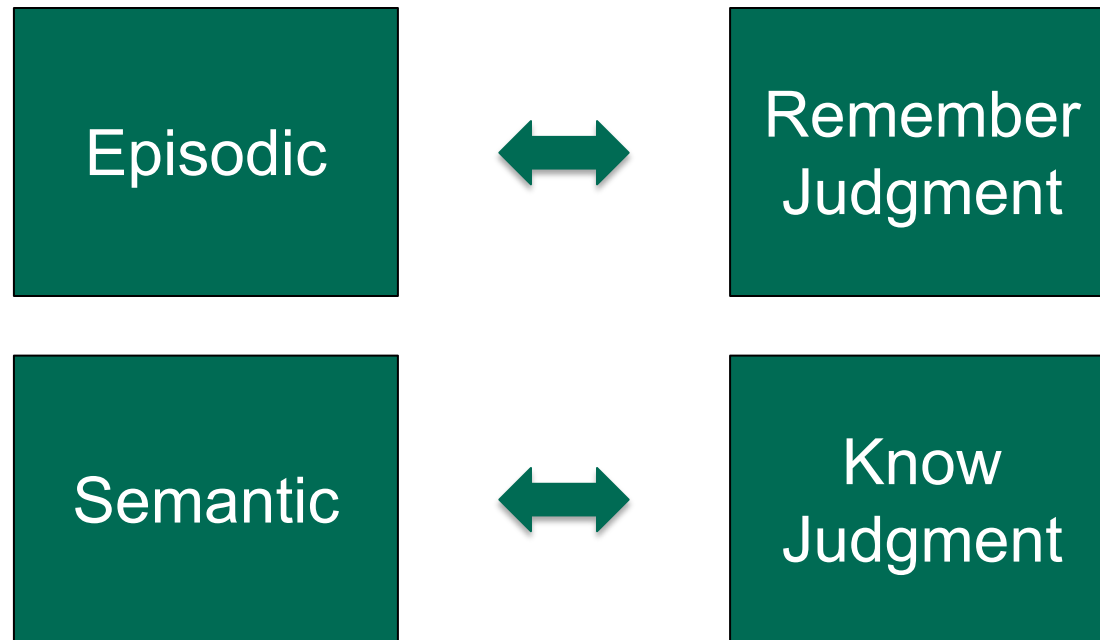
Semantic	Episodic
<input type="checkbox"/> Context-independent	<input type="checkbox"/> Context-dependent
<input type="checkbox"/> Generalized impressions	<input type="checkbox"/> Rich details



Source: Academy of Management

Tulving, 1983, 1985, 2002

Metacognition



Tulving, 1985; Diana et al., 2007

Capture Memory Processing



My manager asks for ideas that challenge his/her core beliefs.

Does this statement describe your manager?

Yes (1)

☐

No (2)

☐

Remembering is based on a vivid recollection of a specific event. Knowing is based on a general feeling or impression about a person.

Using the definition above, was your response to the item below a "remember" or "know" judgment?

My manager asks for ideas that challenge his/her core beliefs.

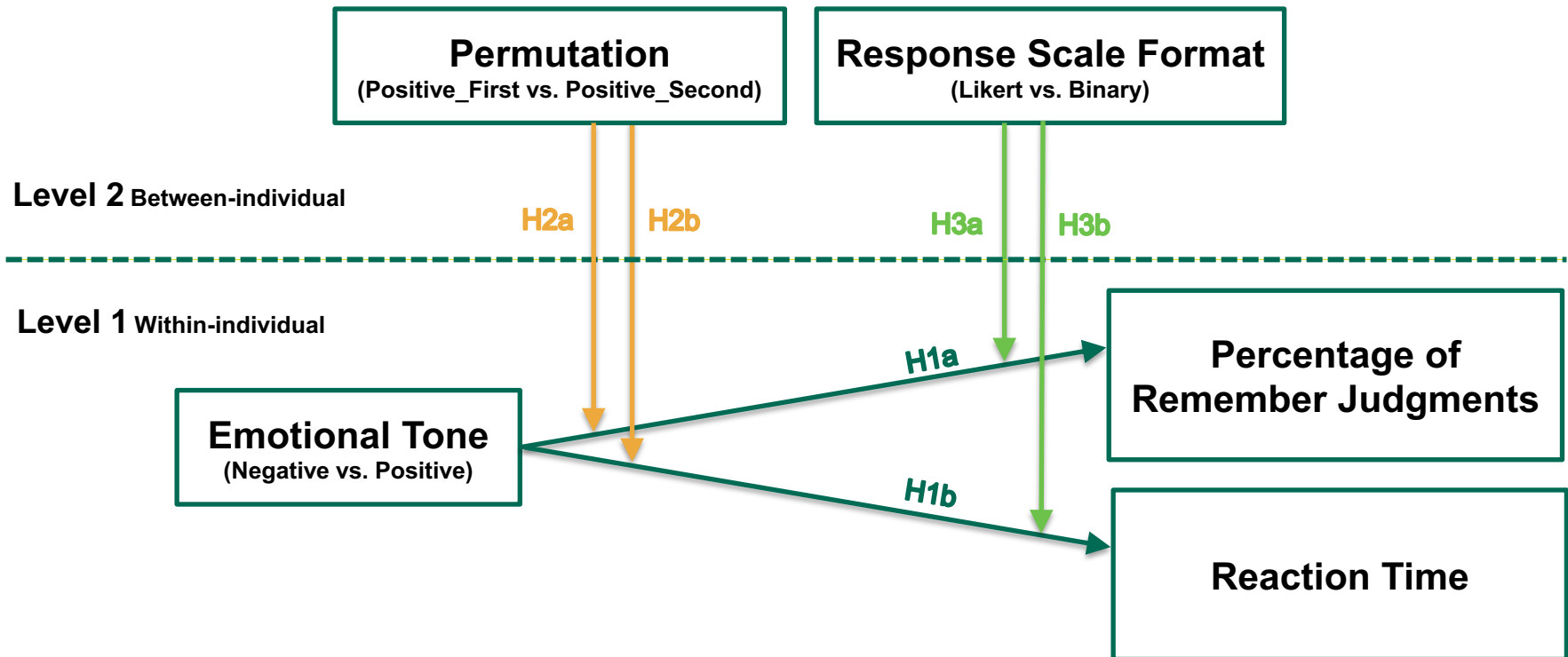
Remember (1)

☐

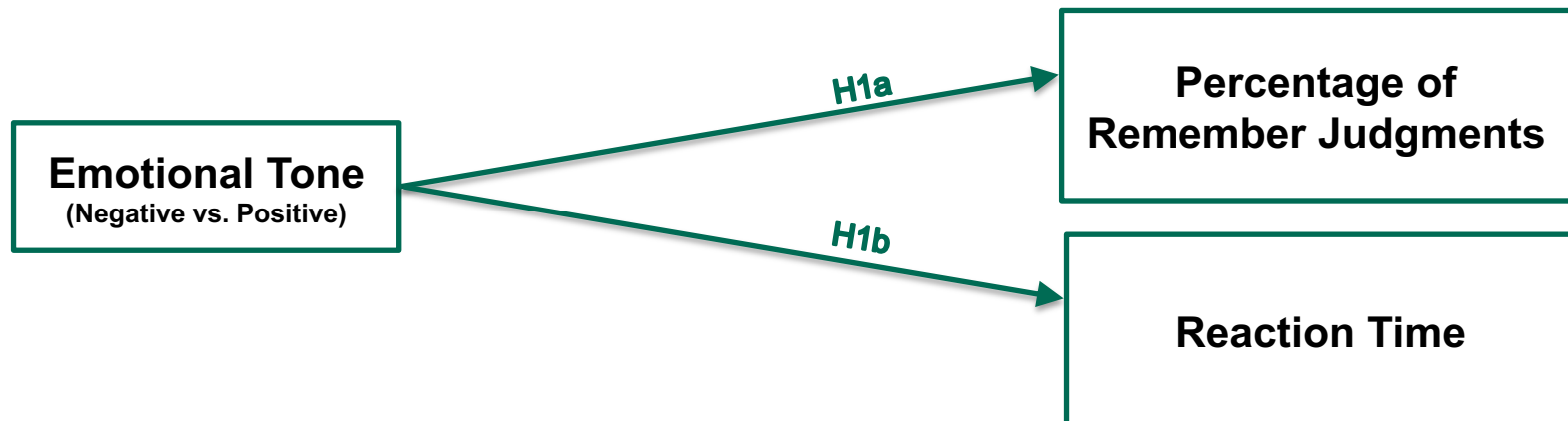
Know (2)

☐

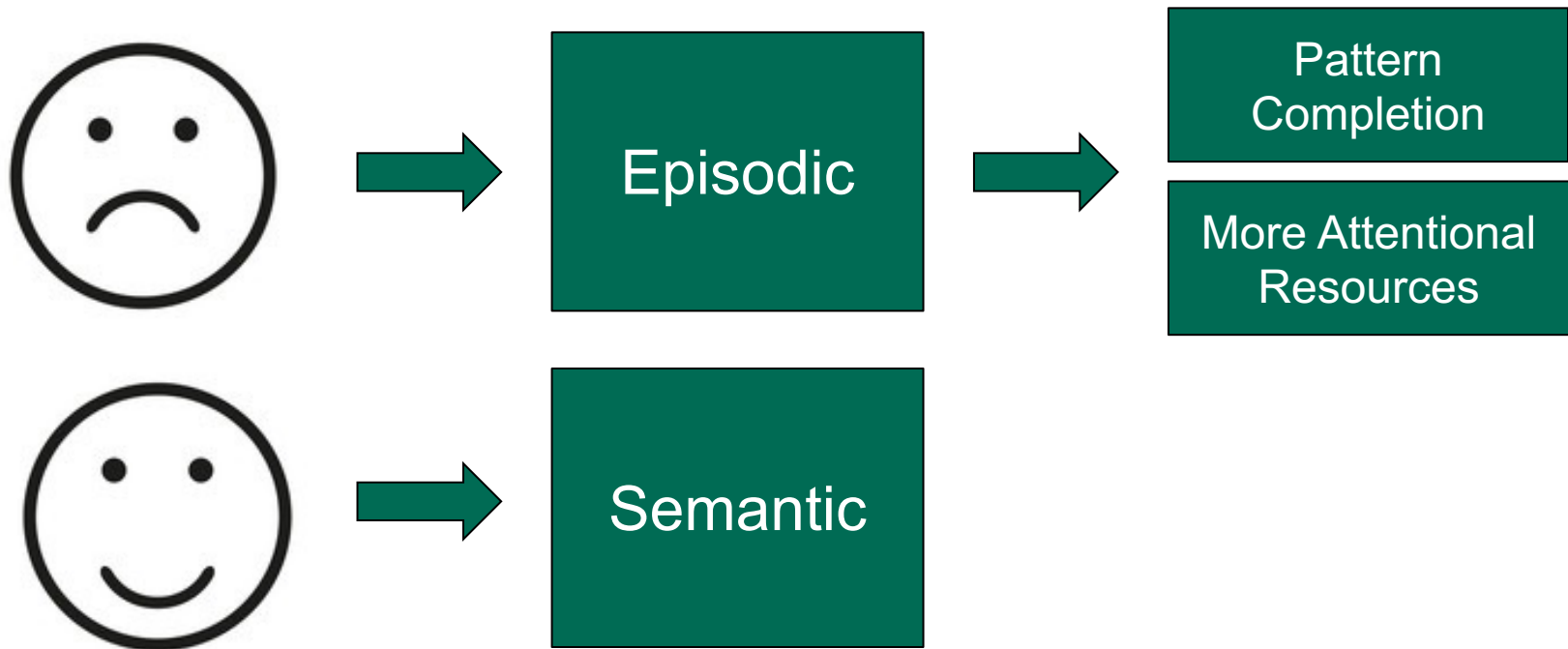
Conceptual Model



Emotional Tone and Memory Processing



Emotional Tone and Memory Processing



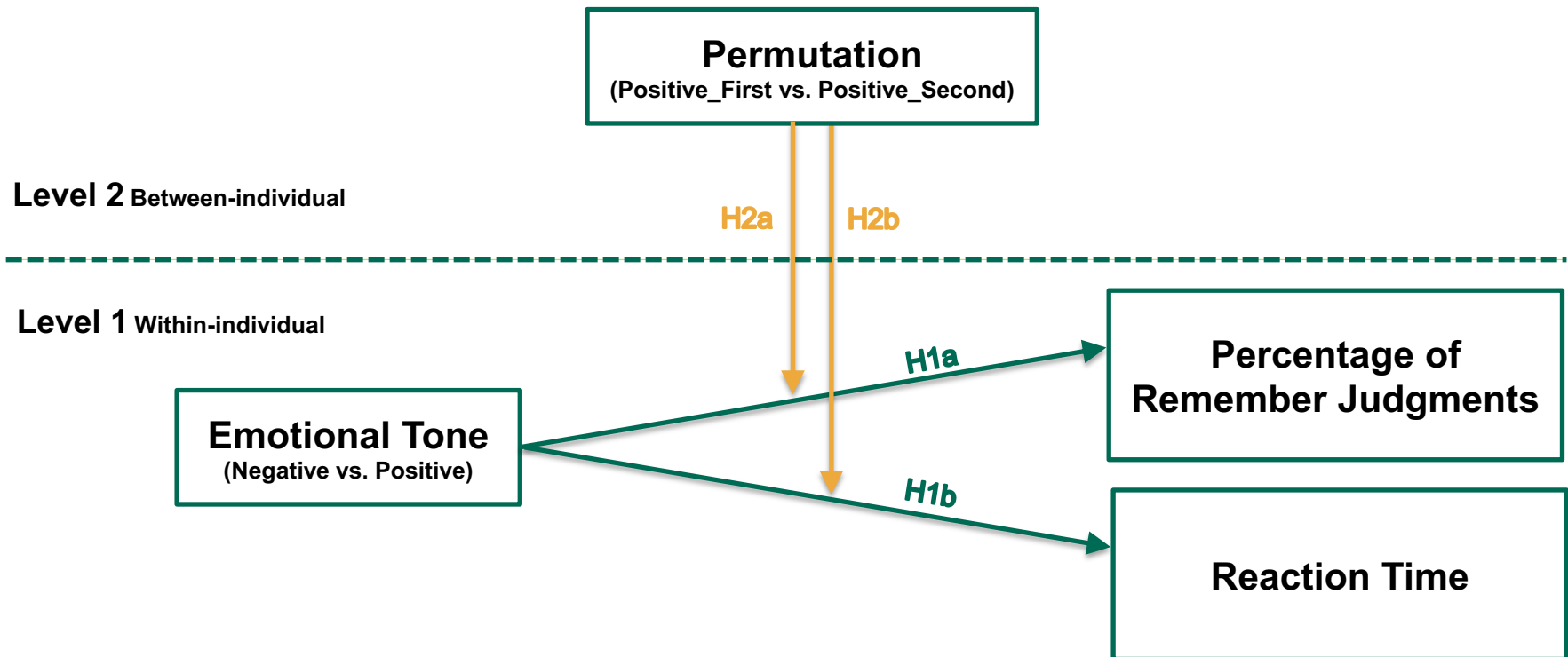
Baumeister et al., 2001; Allen et al., 2008; Bless, 2001; Clore et al., 2001
Rimmele et al., 2011, Horner & Burgess, 2013, 2014

Emotional Tone and Memory Processing

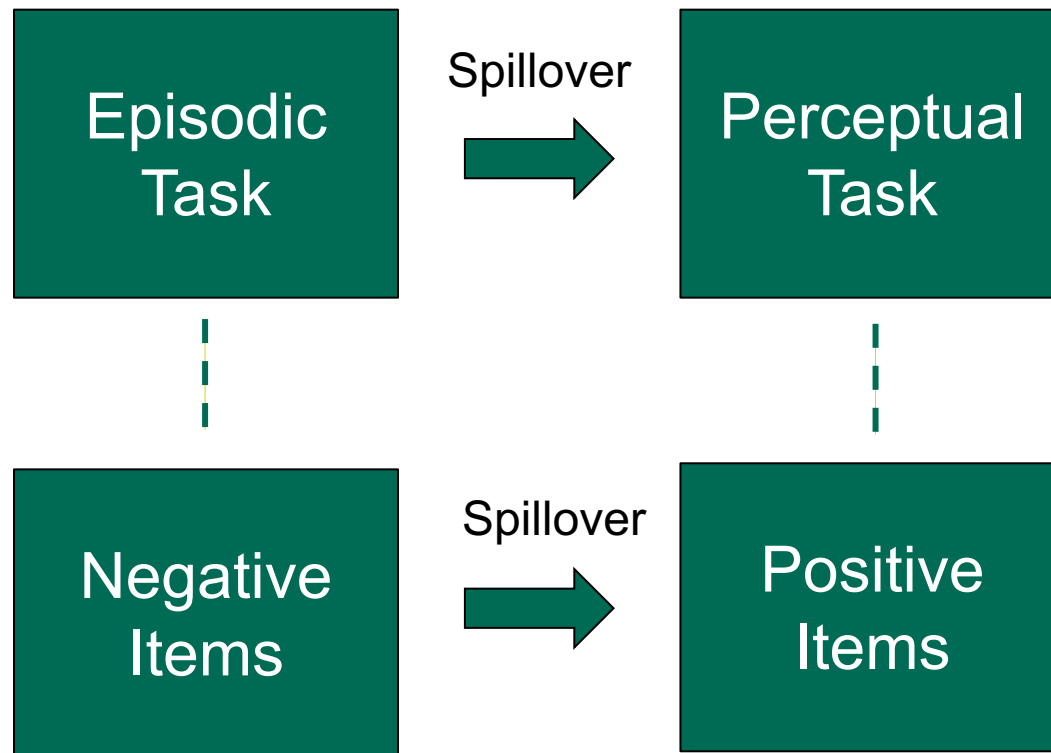
H1a: Positive leadership items will have fewer remember judgments than negative leadership items.

H1b: Positive leadership items will incur a shorter reaction time than negative leadership items.

Permutation and Memory Processing



Permutation and Memory Processing



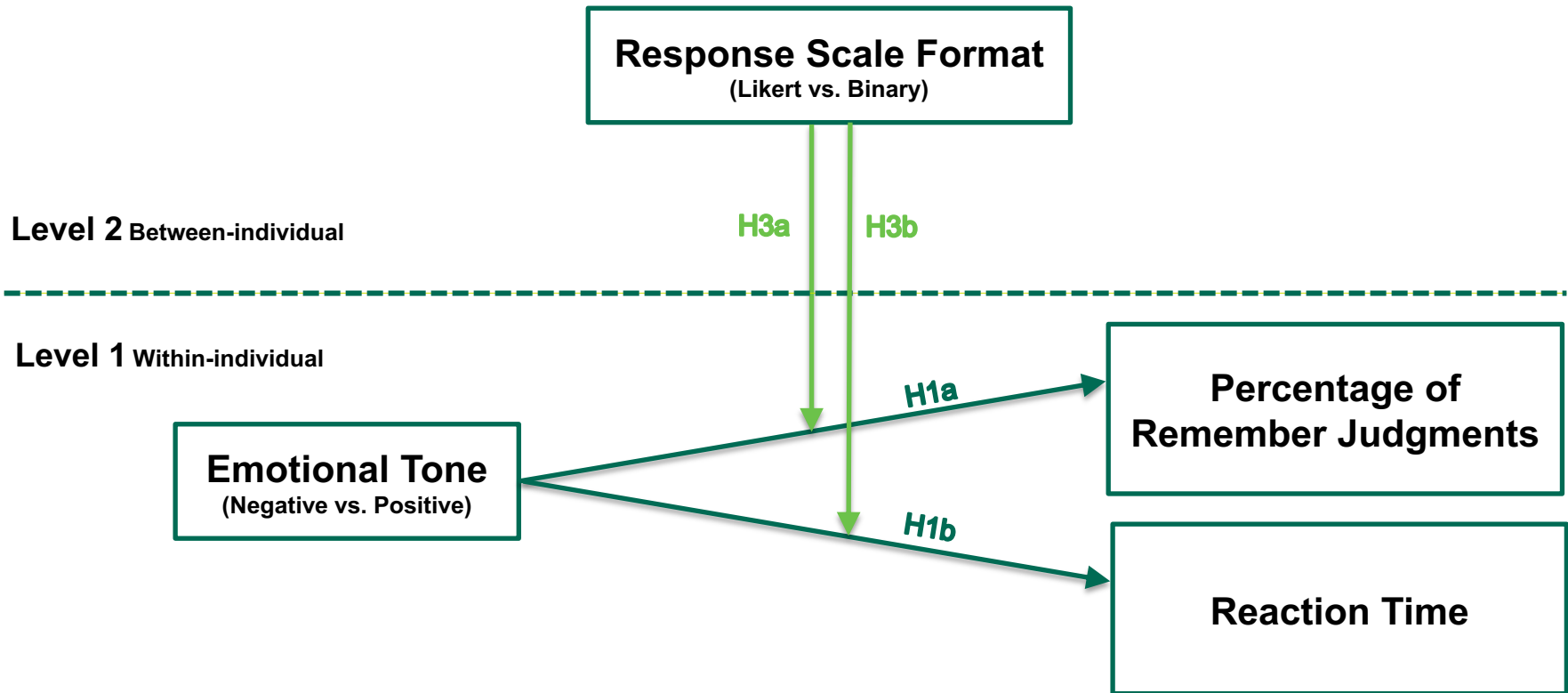
Dudai, 2012; Moscovitch et al., 2016; Sekeres et al., 2018; Squire et al., 2015
Evans et al., 2015; Winocur & Moscovitch, 2011; Renoult et al., 2019

Permutation and Memory Processing

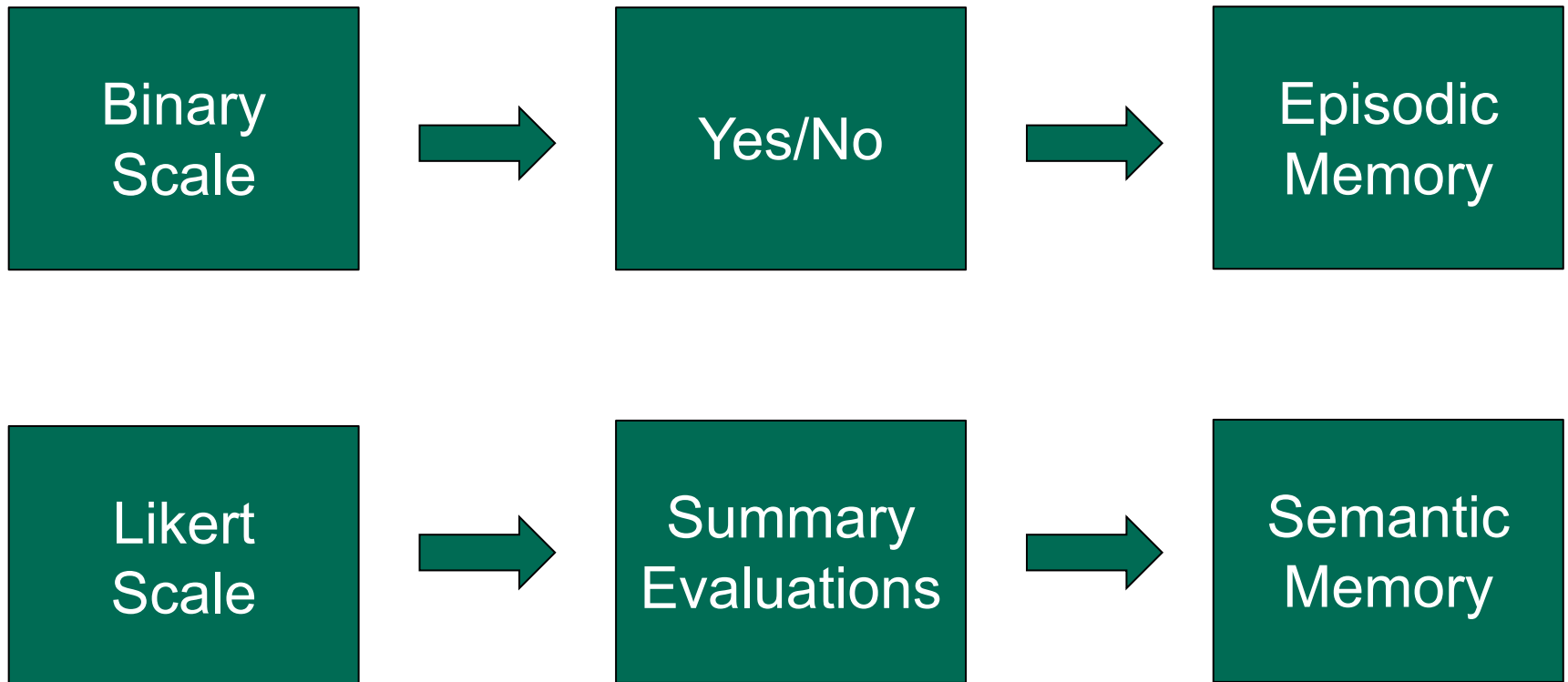
H2a: The effect of positive leadership items on remember judgments will be weaker when answered second.

H2b: The effect of positive leadership items on reaction time will be weaker when answered second.

Response Scale Format and Memory Processing



Response Scale Format and Memory Processing



Hansbrough et al., 2021

Response Scale Format and Memory Processing

H3a: The effect of positive leadership items on remember judgments will be weaker when using binary scale.

H3b: The effect of positive leadership items on reaction time will be weaker when using binary scale.

Selection of Leadership Items

7 Leadership Scales		
Scales	Items	Source
Ethical	10	Brown et al., 2005
LMX	12	Graen & Uhl-Bien, 1995
Servant	28	Liden & Maslyn, 1998
Abusive	15	Tepper, 2000
Exploitative	15	Schmid et al., 2017
Toxic	30	Schmidt, 2008
Authentic	16	Neider & Schriesheim, 2011
Total	126	



K-means Clustering	
Concreteness	Doc2concrete
Self-reference	LIWC (i)
Emotional valence	LIWC (affect)



Manipulation Check
Separate Questionnaire

Yeomans, 2021; Blaney, 1986; Jiga-Boy et al., 2013; Marschark & Cornoldi, 1991; Paivio, 1991

Manipulation Check

My manager tells subordinates they are incompetent.

Do you perceive this statement to be positive or negative?

Positive (1)



Negative (2)



Pos_Neg	n	Concreteness		Self-reference		Emotional Valence	
		Mean	Sd	Mean	Sd	Mean	Sd
Negative	10	2.62	0.20	0.80	2.47	13.9	4
Positive	10	2.51	0.22	0.83	2.62	14.6	4.08
t.Test (p-value)		0.1101		0.968		0.692	

10 Positive Leadership Items

Ethical Leadership (Brown et al., 2005)

Ethical 4	My manager has the best interests of employees in mind.
Ethical 5	My manager makes fair and balanced decisions.
Ethical 6	My manager can be trusted.

LMX (Graen & Uhl-Bien, 1995)

LMX 3	My manager is the kind of person one would like to have as a friend.
--------------	--

Servant Leadership (Liden et al., 2008)

Servant 1	My manager can tell if something is going wrong.
Servant 14	My manager is always interested in helping people in our community.

Authentic Leadership (Neider & Schriesheim, 2011)

Authentic 1	My manager solicits feedback for improving his/her dealings with others.
Authentic 4	My manager asks for ideas that challenge his/her core beliefs.
Authentic 6	My manager admits mistakes when they occur.
Authentic 9	My manager shows that he/she understands his/her strengths and weaknesses.

10 Negative Leadership Items

Toxic Leadership (Schmidt, 2008)

Toxic 2	My manager denies responsibility got mistakes made in their unit.
Toxic 8	My manager is not considerate about subordinates' commitments outside of work.
Toxic 10	My manager publicly belittles subordinates.
Toxic 12	My manager tells subordinates they are incompetent.
Toxic 13	My manager has explosive outbursts.
Toxic 15	My manager expresses anger at subordinates for unknown reasons.
Toxic 27	My manager does not permit subordinates to approach goals in new ways.

Abusive Leadership (Tepper, 2000)

Abusive 10	My manager expresses anger at me when he/she is mad for another reason.
-------------------	---

Exploitative Leadership (Schmid et al., 2019)

Exploitative 9	My manager gives me boring routine tasks when he or she can benefit from it.
Exploitative 14	My manager manipulates others to reach his or her goals.

2 x 2 x 2 Mixed Design

<div> <div>Response Scale Format (between)</div> <div>Emotional Tone (within)</div> <div>Permutation (between)</div> </div>	Binary		Likert	
	Positive	Negative	Positive	Negative
Positive First	Group 1		Group 3	
Positive Second	Group 2		Group 4	

- Sample size: 400 (2 x 200)
- Prolific
- Screening criteria:
 - Full-time employee
 - Native English speaker
 - Use keyboards

Measures

- **Dependent variables**
 - Memory processing: Percentage of remember judgments
 - Reaction time (seconds)
- **Independent variables**
 - Emotional tone (0 – Negative, 1 – Positive)
 - Permutation (0 – Positive_First, 1 – Positive_Second)
 - Response scale format (0 – Likert, 1 – Binary)
- **Control variables**
 - Dyadic duration (1 – 5, from 0 – 6 months to over 5 years)
 - Interaction frequency (1 – 6, once or twice every 3 months to many times daily)
 - Sentiment of last interaction (1 – positive, 2 – negative)

Pre-Registration

All hypotheses & data analysis plan pre-registered before data collection

'Emotional Tone Embedded in Leadership Items and Memory Processing, November 2022'

(AsPredicted #112261)

Created: 11/08/2022 12:09 PM (PT)

Author(s)

Mengying Li (Binghamton University, SUNY) - mli219@binghamton.edu

Bryan Acton (Binghamton University, SUNY) - bacton@binghamton.edu

1) Have any data been collected for this study already?

No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?

H1a: Positive leadership items will have fewer remember judgments than negative leadership items.

H1b: Positive leadership items will incur a shorter reaction time than negative leadership items.

H2a: The effect of positive leadership items on remember judgments will be weaker when answered second.

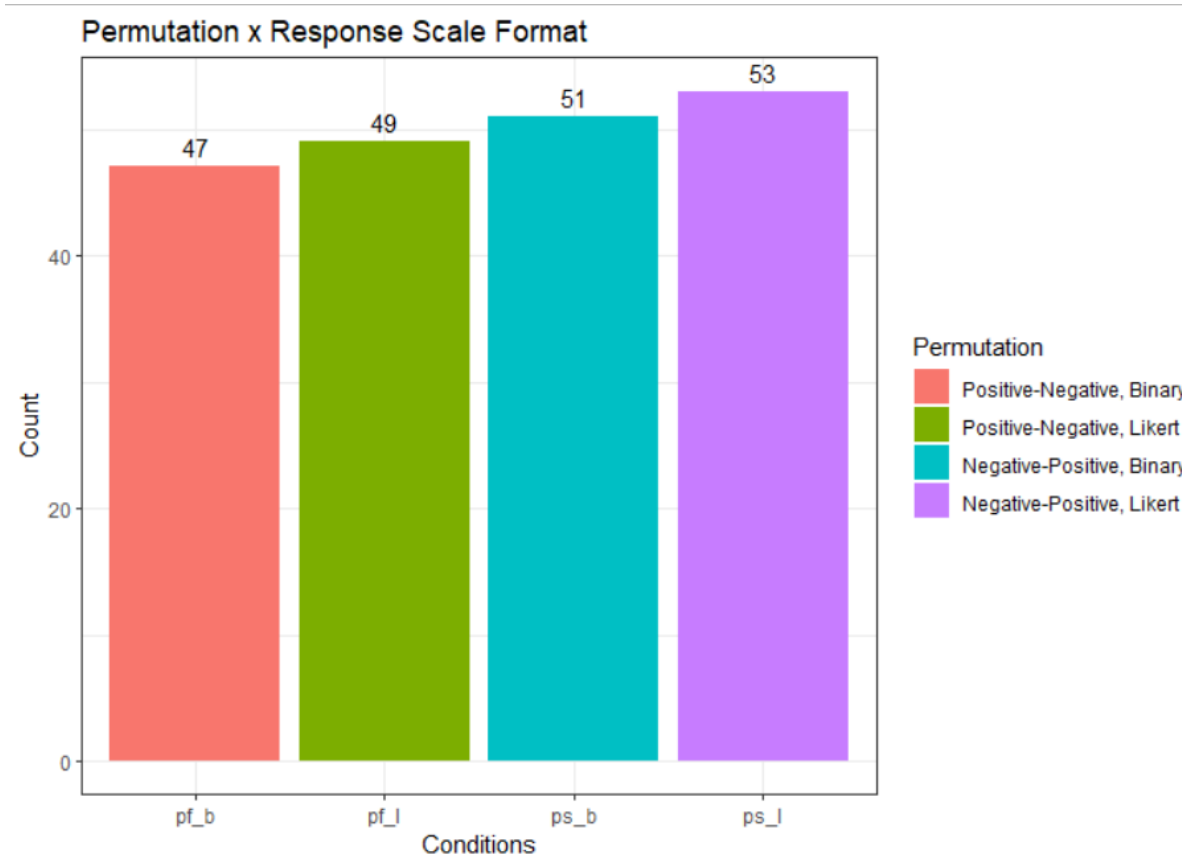
H2b: The effect of positive leadership items on reaction time will be weaker when answered second.

H3a: The effect of positive leadership items on remember judgments will be weaker when using binary scale.

H3b: The effect of positive leadership items on reaction time will be weaker when using binary scale.



Data Collection



Data Cleaning

- Removed 4 responses that failed the data integrity check
- Removed 15 responses that failed the remember/know check

Example of a “Remember” Item

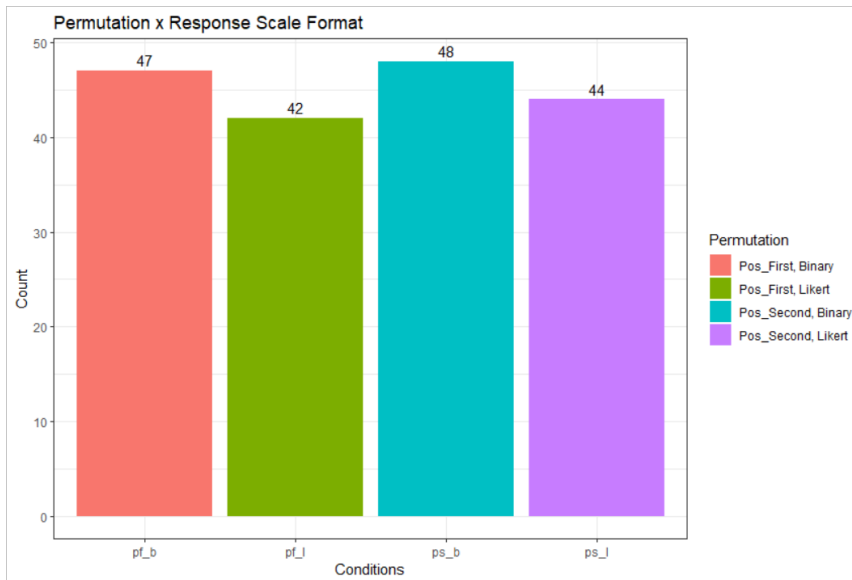
I chose remember because it happened in the past. everything that was know was because it currently happens in the present

NONE

bc it was based on a feeling and intuition not fact

Because I can remember that quality in my manager but don't have a specific example.

Data Post-Cleaning



		Response Scale Format		
		Binary	Likert	Total
Permutation	Pos First	47	42	89
	Pos Second	48	44	92
	Total	95	86	181

Two-Level Mixed-Effects Model

- **Level 1 (within-individual):**

$$\text{Remember_Percent}_{ij} = \beta_{0j} + \beta_{1j}(\text{Emotional_Tone}_{ij}) + r_{ij}$$

- **Level 2 (between-individual):**

- $\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Permutation}_j) + \gamma_{02}(\text{Response_Scale_Format}_j) + u_{0j}$

- $\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Permutation}_j) + \gamma_{12}(\text{Response_Scale_Format}_j) + u_{1j}$

- $\text{Remember_Percent}_{ij} =$

$$\gamma_{00} + \gamma_{10}(\text{Emotional_Tone}_{ij}) +$$

$$\gamma_{01}(\text{Permutation}_j) + \gamma_{11}(\text{Emotional_Tone}_{ij})(\text{Permutation}_j) +$$

$$\gamma_{02}(\text{Response_Scale_Format}_j) + \gamma_{12}(\text{Emotional_Tone}_{ij})(\text{Response_Scale_Format}_j) +$$

$$u_{1j}(\text{Emotional_Tone}_{ij}) + u_{0j} + u_{1j}$$

Results for the Mixed-Effects Model				
	Percentage of Remember Judgments		Reaction Time	
Predictors	Estimates	SE	Estimates	SE
Fixed Effects				
Intercept (γ_{00})	0.51***	0.04	1.54***	0.25
Emotional Tone (γ_{10})	-0.05	0.04	1.87***	0.24
Permutation (γ_{01})	-0.15***	0.04	2.03***	0.28
Response Scale Format (γ_{02})	-0.03	0.04	0.13	0.28
Emotional Tone x Permutation (γ_{11})	0.11*	0.05	-3.66***	0.27
Emotional Tone x Response Scale Format (γ_{12})	0.04	0.05	-0.27	0.27
Random Effects				
Level-1 residual variance (σ^2)	0.01		0.51	
Level-2 intercept variance (τ_{00})	0.07		2.95	
Variance in slopes (τ_{11})	0.07		2.19	
ICC	0.81		0.84	
Observations	362		362	
Marginal R ² / Conditional R ²	0.046 / 0.820		0.211 / 0.873	

Note. Level-1 $N = 2$; Level-2 $N = 181$. All entries are unstandardized regression coefficients.

* $p < .05$, ** $p < .01$, *** $p < .001$

Hypotheses vs. Results

	Hypotheses	Results	Conclusion
DV: Percentage of remember judgments			
H1a	γ_{10} Neg *	Insignificant	Not Supported
H2a	γ_{01} Pos ** / γ_{11} Neg	γ_{01} Neg / γ_{11} Pos	Contradictory
H3a	γ_{02} Pos / γ_{12} Neg	Insignificant	Not Supported
DV: Reaction time			
H1b	γ_{10} Neg	γ_{10} Pos	Contradictory
H2b	γ_{01} Pos / γ_{11} Neg	γ_{01} Neg / γ_{11} Pos	Contradictory
H3b	γ_{02} Pos / γ_{12} Neg	Insignificant	Not Supported

H1a Result



Positive



Negative

Memory Processing Not Significantly Different

$$Mean_{positive} = 0.45$$

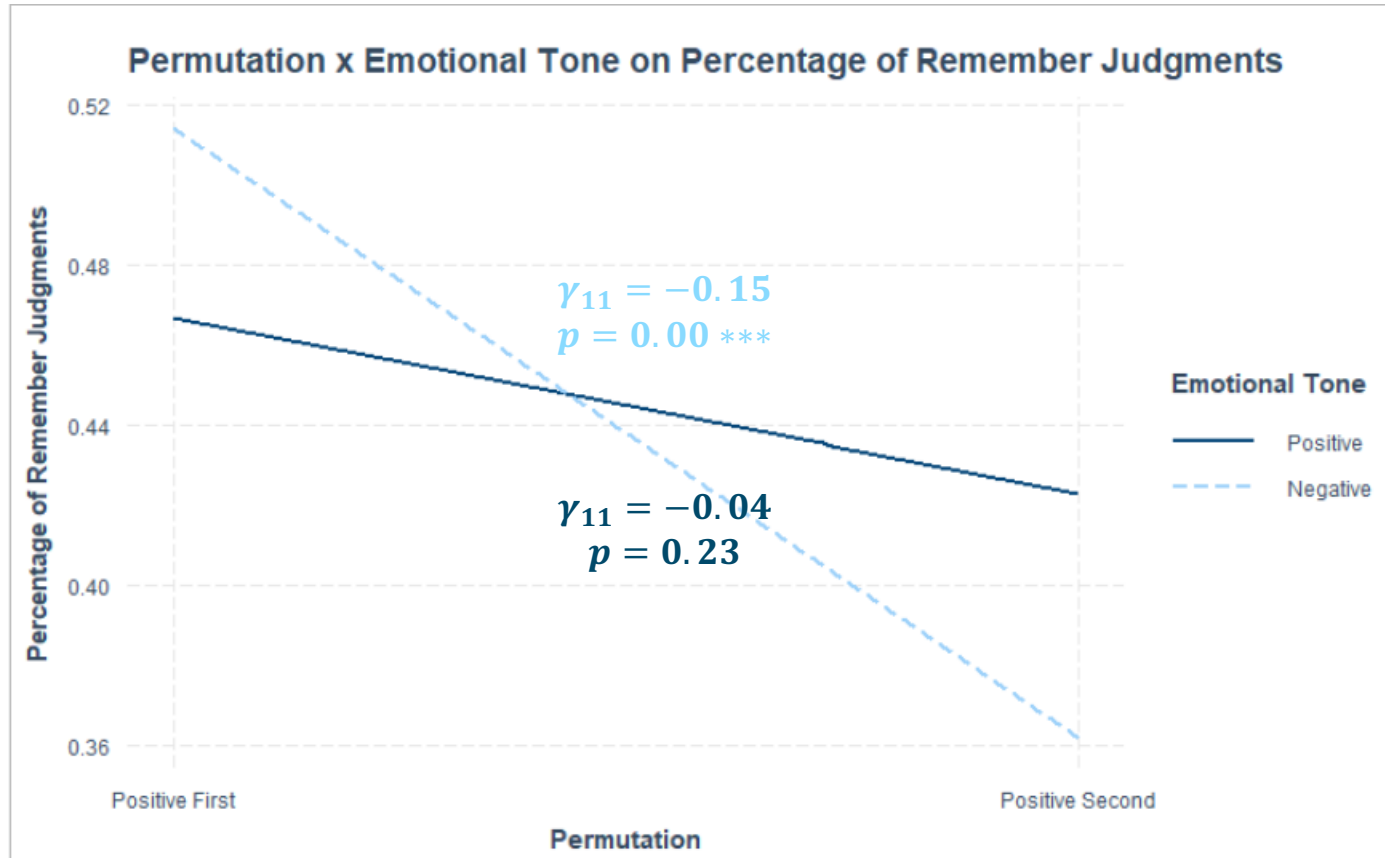
$$Mean_{negative} = 0.42$$

$$p = 0.2939$$

$$Mean = 0.44$$

H2a Result

Cross-level moderating effect of permutation



H2a Expectation

Permutation = Positive_First

**Fewer
Remember
Judgments**

Positive

Negative



Negative

Positive

**More
Remember
Judgments**

Permutation = Positive_Second

H2a Result

Permutation = Positive_First

Positive

Negative

More
Remember
Judgments



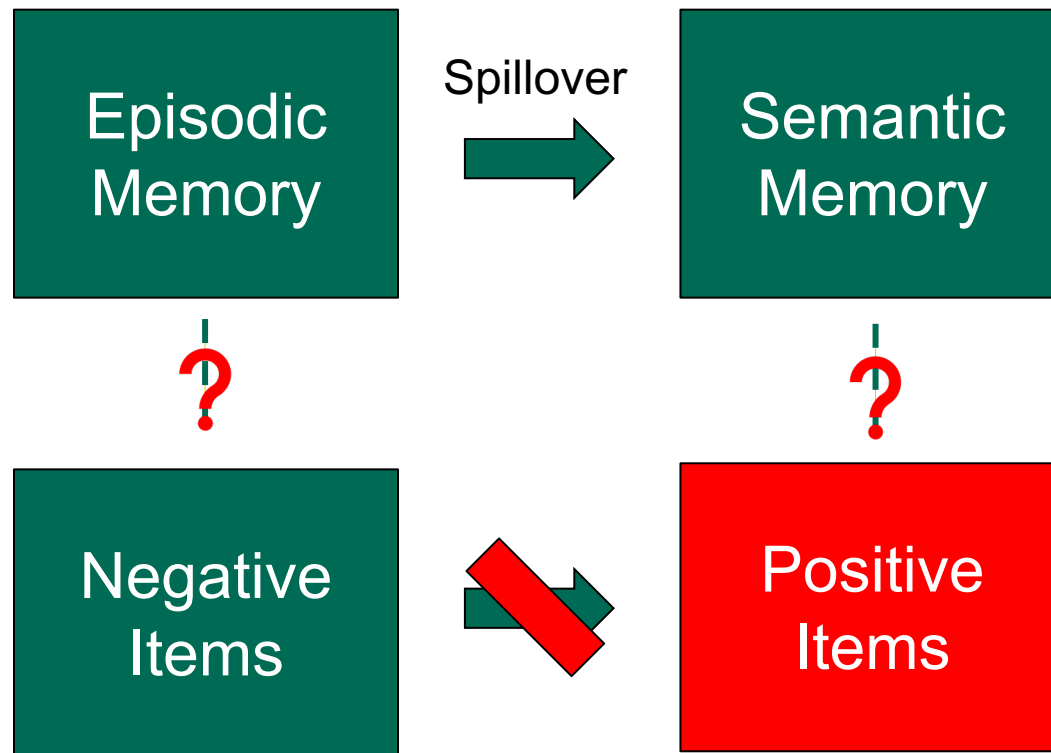
Fewer
Remember
Judgments

Negative

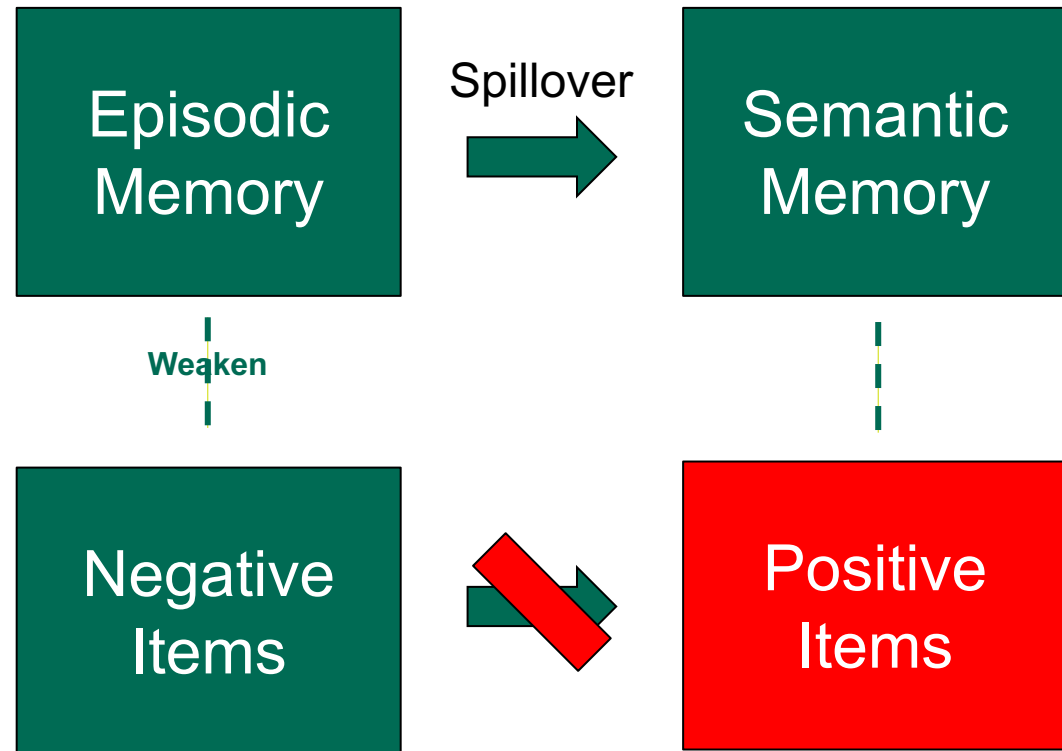
Positive

Permutation = Positive_Second

Potential Explanations



Base Rate



Low Base Rate

- Natural selection (Banks et al., 2021)
- Asymmetrical distribution (Walker et al., 2003)

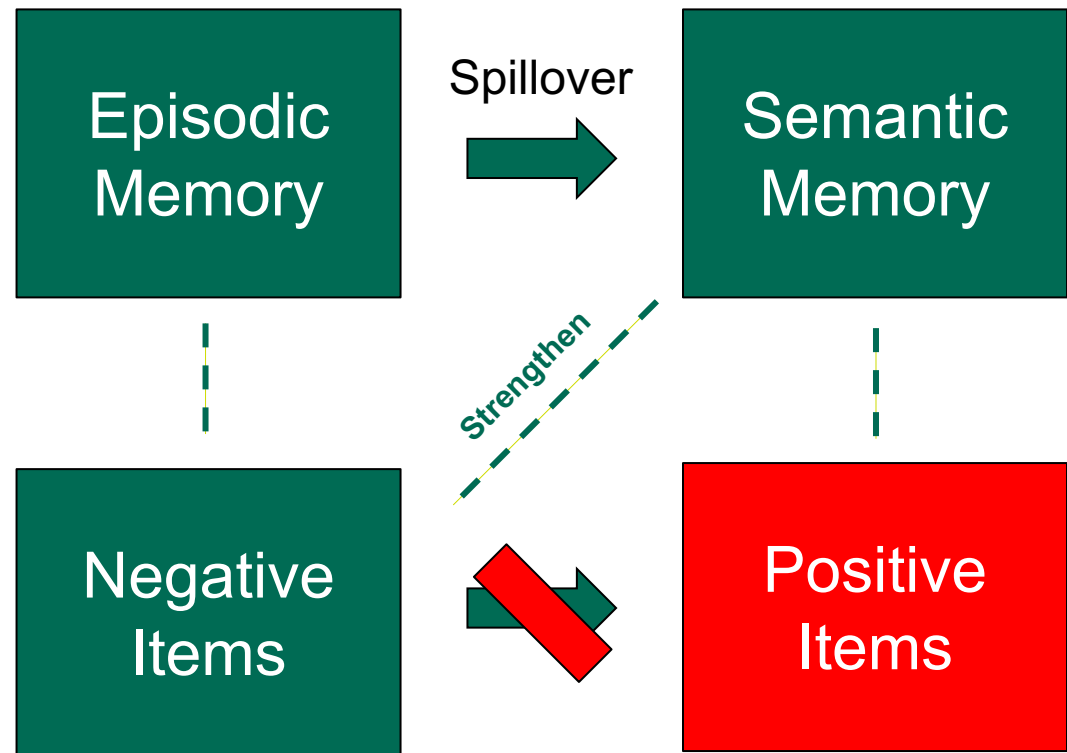
Base Rate

	Likert	Binary	Remember Judgment
Positive	Mean = 3.58 SD = 0.31	73% Yes	46%
Negative	Mean = 1.77 SD = 0.25	17% Yes	15%
p-value	P < 0.001	P < 0.01	

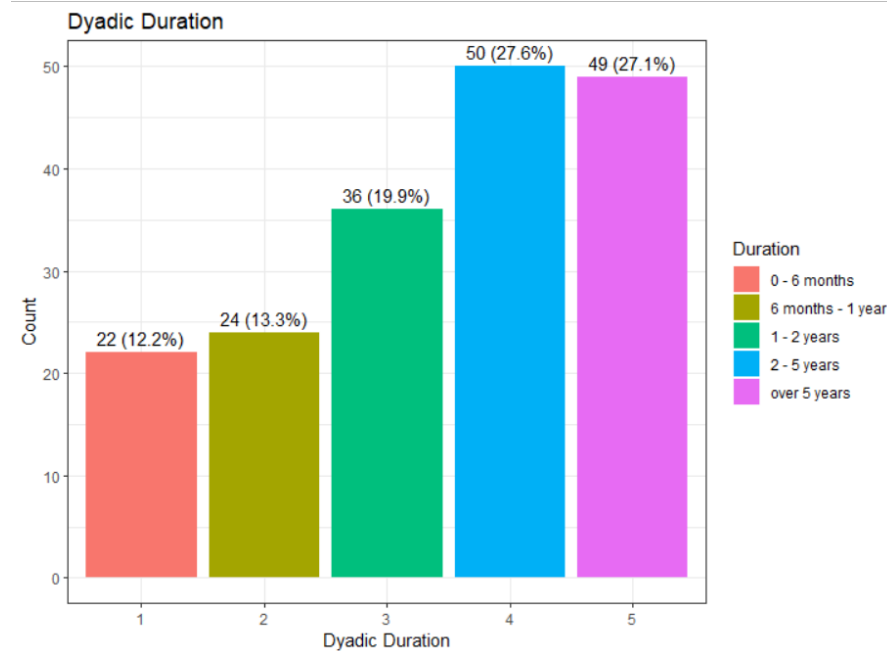
* The remaining 38% provided more objective description of a remember item, such as “I chose remember when I had a specific memory of a situation pertaining to the statement”.

Lack of Experience

"I know my boss would not belittle someone because it doesn't seem like something he would do. I have not seen him belittle anyone or recall him stating explicitly. It was something he wouldn't do."

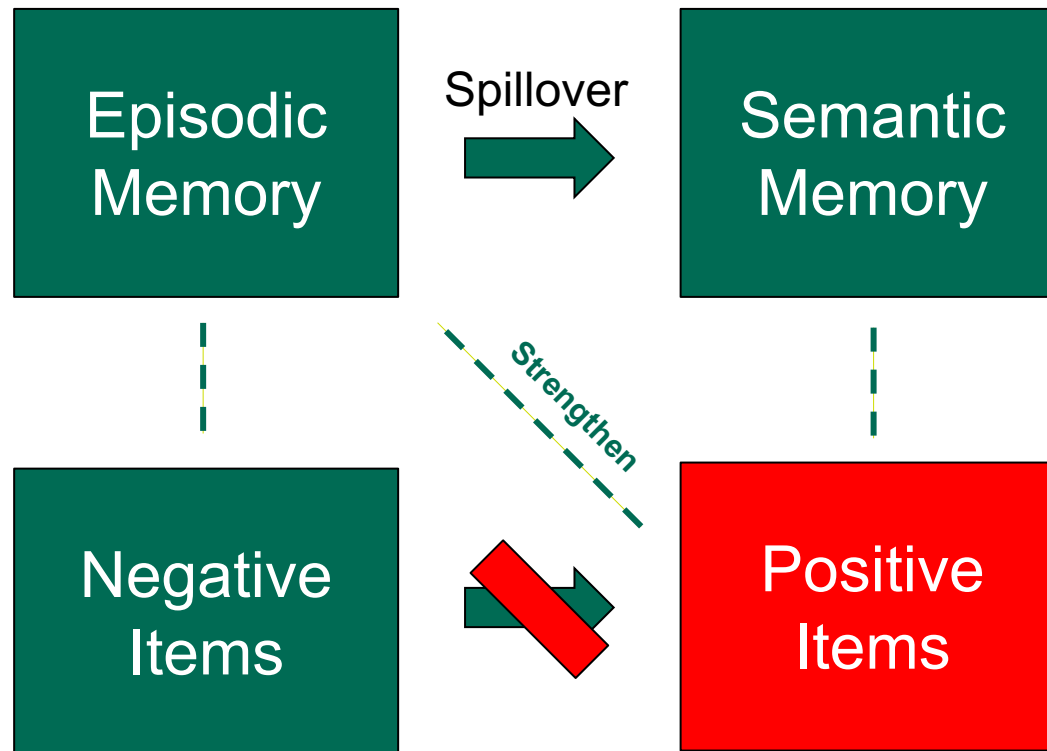


Dyadic Duration



Mean	SD
3.44 (2 ~ 5 years)	1.34

Short Dyadic Duration



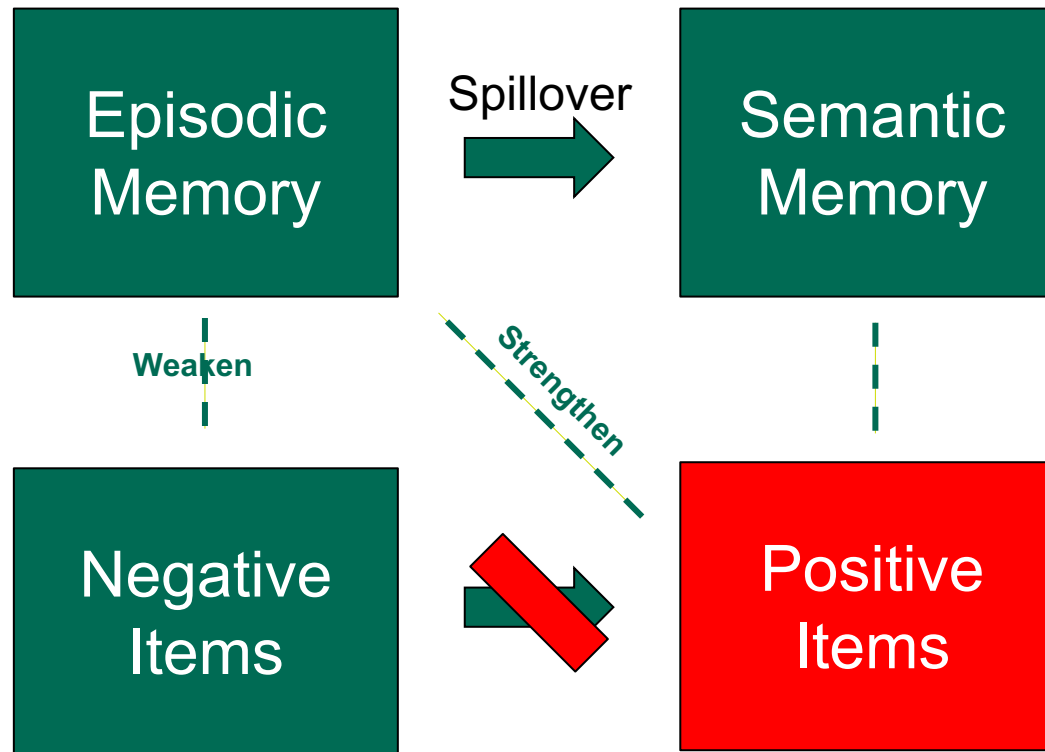
Social Desirability



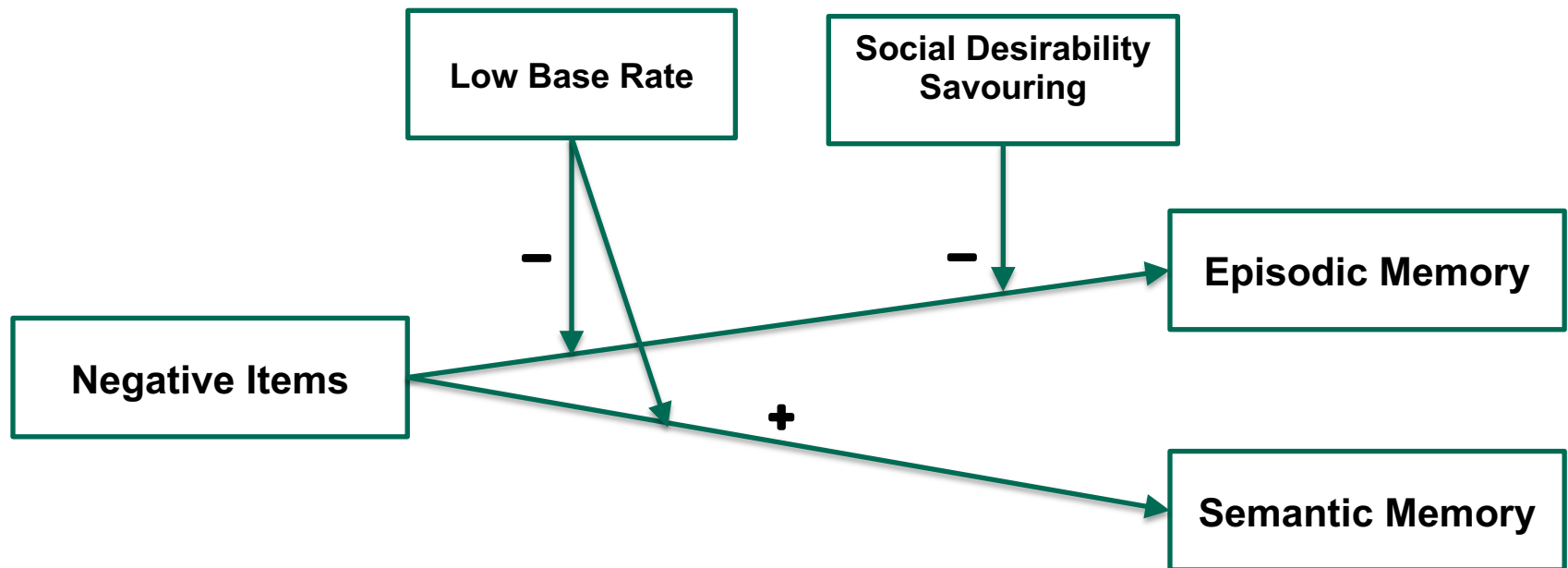
Negative
leadership
events.

Positive
leadership
events.

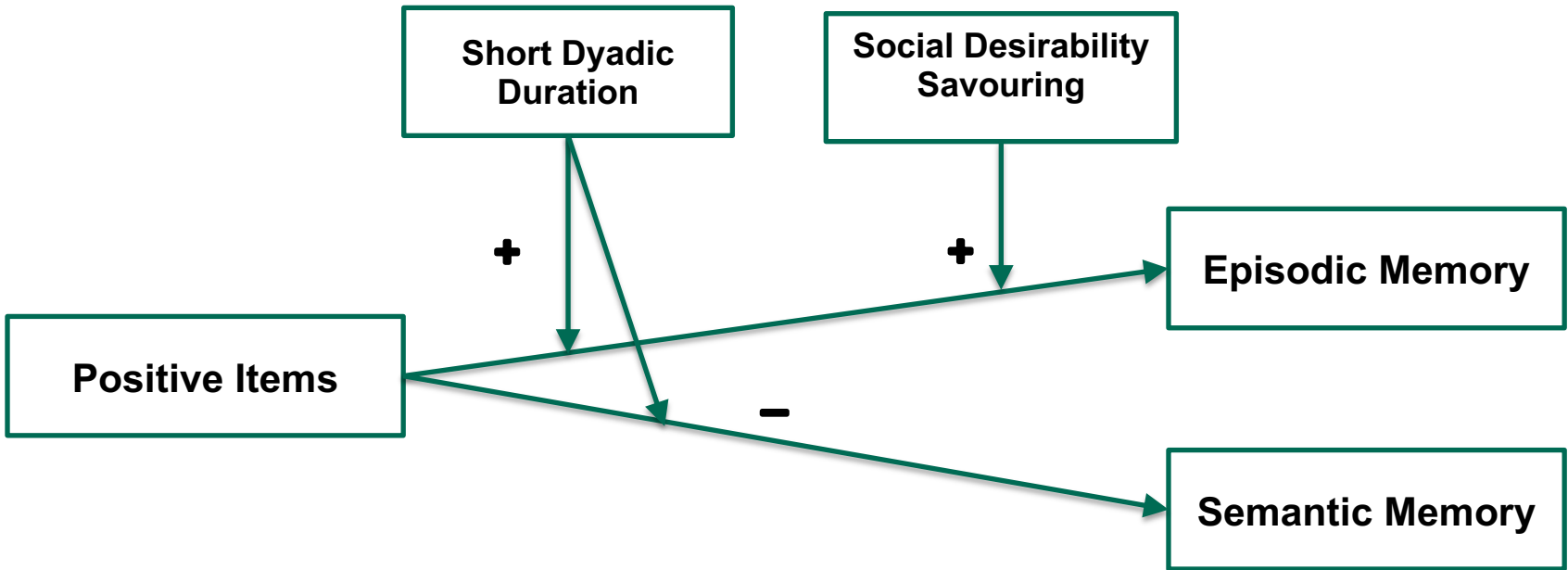
Social Desirability



Potential Explanations



Potential Explanations



Hypotheses vs. Results

	Hypotheses	Results	Conclusion
DV: Percentage of remember judgments			
H1a	γ_{10} Neg *	Insignificant	Not Supported
H2a	γ_{01} Pos ** / γ_{11} Neg	γ_{01} Neg / γ_{11} Pos	Contradictory
H3a	γ_{02} Pos / γ_{12} Neg	Insignificant	Not Supported
DV: Reaction time			
H1b	γ_{10} Neg	γ_{10} Pos	Contradictory
H2b	γ_{01} Pos / γ_{11} Neg	γ_{01} Neg / γ_{11} Pos	Contradictory
H3b	γ_{02} Pos / γ_{12} Neg	Insignificant	Not Supported

H1b Result

**Longer
Reaction Time**

Positive

Negative

**Shorter
Reaction Time**

H2b Expectation

Permutation = Positive_First

**Shorter
Reaction Time**

Positive

Negative

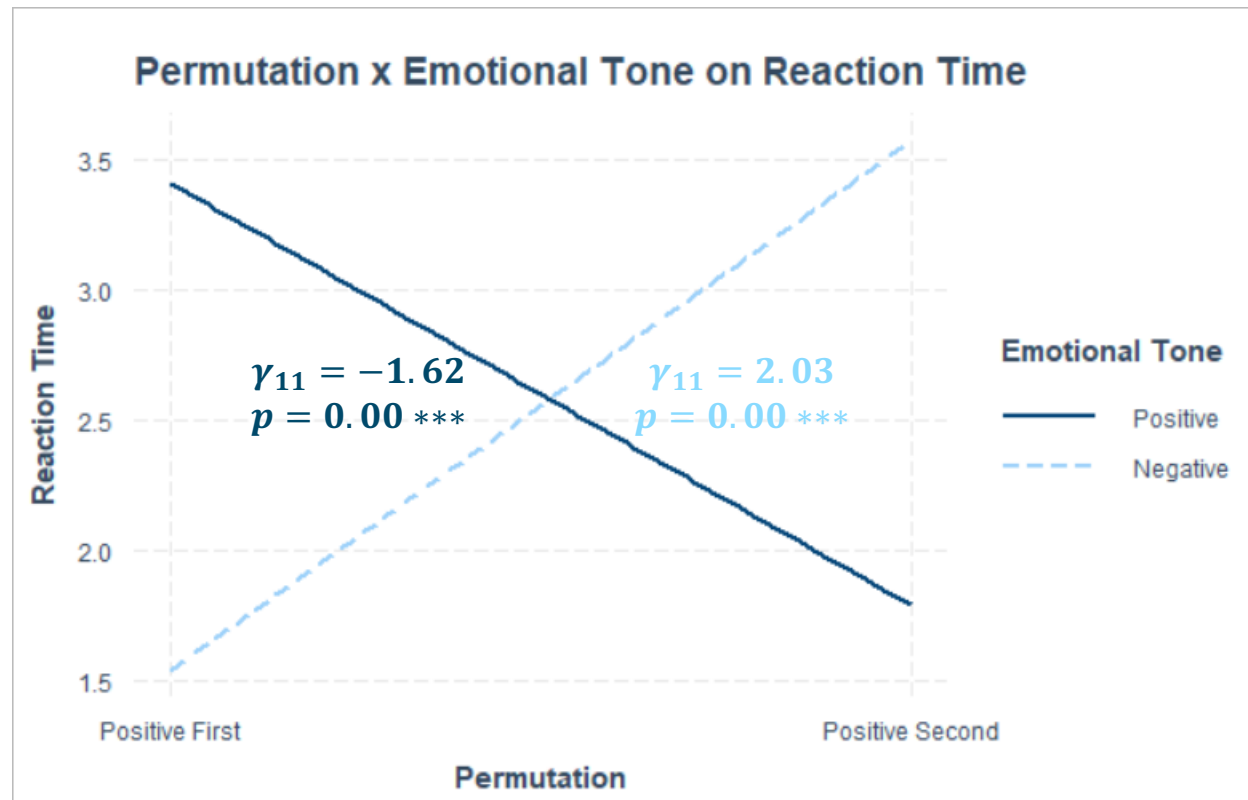
Negative

Positive

**Longer
Reaction Time**

Permutation = Positive_Second

H2b Result



H2b Result

Permutation = Positive_First

**Longer
Reaction Time**

Positive

>

Negative

**Shorter
Reaction Time**

**Longer
Reaction Time**

Negative

>

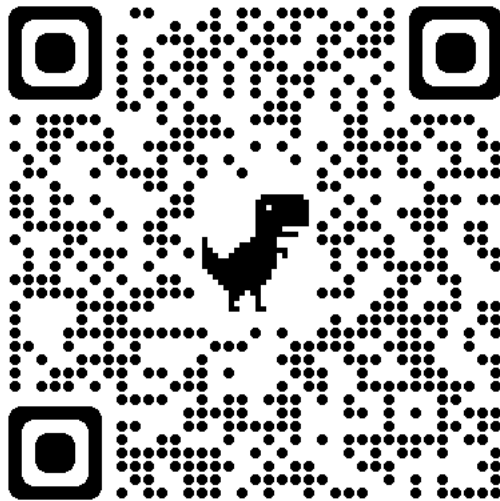
Positive

**Shorter
Reaction Time**

Permutation = Positive_Second

Limitations and Next Steps

- Limitations
 - Individual differences
 - E.g., Frequency and likelihood of positive/negative leadership events
 - The use of remember-know paradigm
- Next Steps
 - Employ experimental vignette approach
 - Mitigate the concern about individual differences
 - Engage fMRI
 - Replicate the results
 - Examine further the recall discrepancy between positive and negative events



BERNARD M. & RUTH R. BASS
CENTER FOR LEADERSHIP STUDIES

BINGHAMTON
UNIVERSITY
STATE UNIVERSITY OF NEW YORK

School of Management



Appendix



Positioning in Extant Research

Rater Factors

- Temporal focus
- Regulatory focus
- Mood
- Private Body Consciousness
- Liking

Item Linguistic Characteristics

- Concreteness, Abstractness
- Self-reference
- Emotional valence

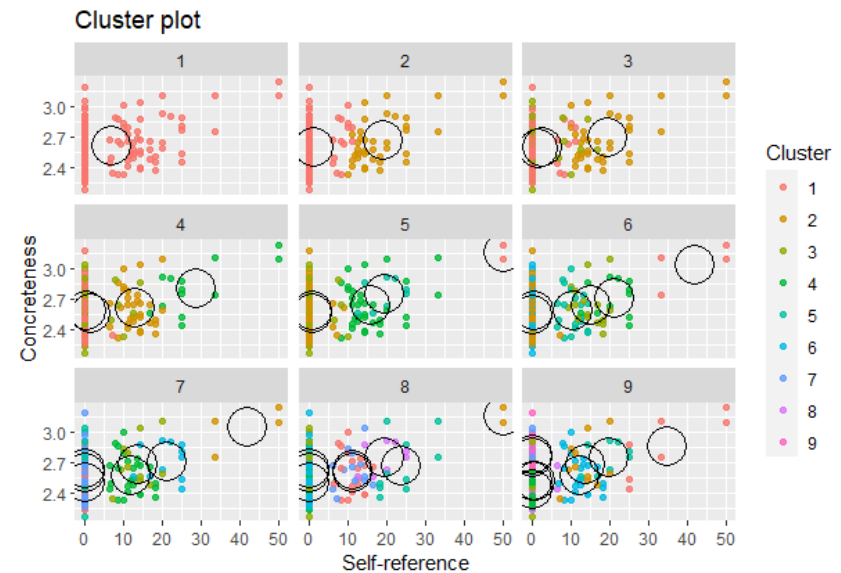
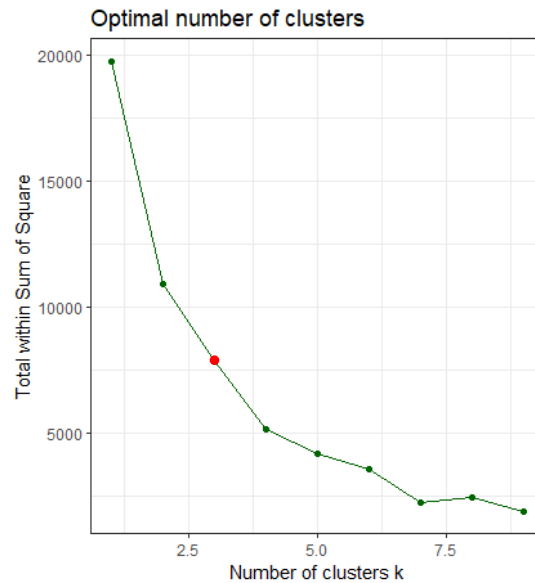
Factors Influencing Memory Processing

Interventions

- Structured recall
- Source monitoring

Emotional Tone Embedded in Items

K-means Clustering



K-means Clustering

K-means Clustering Results								
Cluster	Pos_Neg	n	Mean_Con	Sd_Con	Mean_Self	Sd_Self	Mean_Aff	Sd_Aff
1	Negative	24	2.63	0.23	2.56	4.18	1.93	3.10
1	Positive	23	2.58	0.18	0.71	2.41	0.51	1.70
2	Negative	20	2.62	0.20	0.80	2.47	13.0	4.49
2	Positive	21	2.51	0.22	1.39	3.61	14.9	5.35
3	Negative	16	2.82	0.26	23.3	12.7	9.23	8.07
3	Positive	22	2.60	0.17	16.2	4.35	10.5	7.17

*After removing Ser18, with the highest Affect and Self-reference scores

Remember Items from Pilot Data

Using an example of an item you said was a "remember" item, briefly describe why you picked it as "remember".

When asked if my supervisor allowed others to express their viewpoints I marked it as remember because I can recall **an instance** where they were very critical of this action.

Remembering is recalling a past event, like a past manager **acting a certain way**

I picked remember because I remembered that my supervisor **had done something** like the statement in the past.

One question asked about my manager putting my goals over his and I chose remember because he put in a lot of work to get me a promotion at my current job

Because I could recall **a specific instance** that related to the question being asked

One of the items was asking if my manager takes responsibility for other people's successes. There was **an instance** when a coworker (not my manager) came up with a better way to do something. My manager presented the improved idea from my coworker as my coworker's idea. not her own.

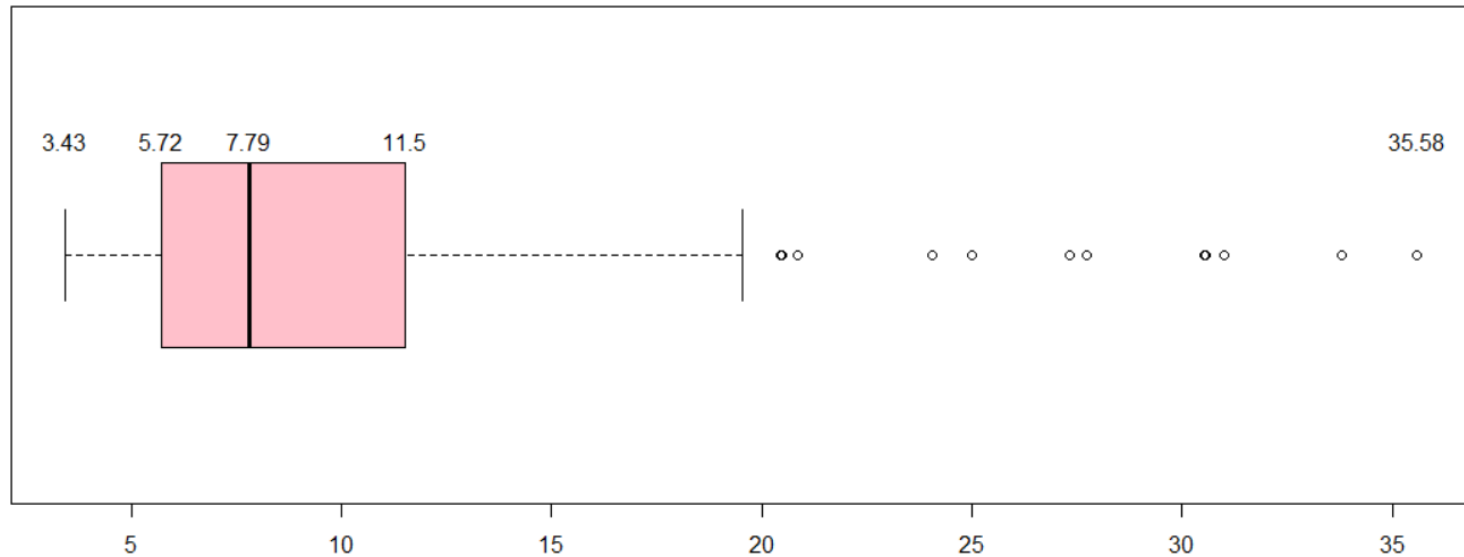
My manager cares about my well-being is a remember because she has taken time to check in with me. I remember her **actions from the past**.

I had a distinct recollection of a **specific memory I directly witnessed**

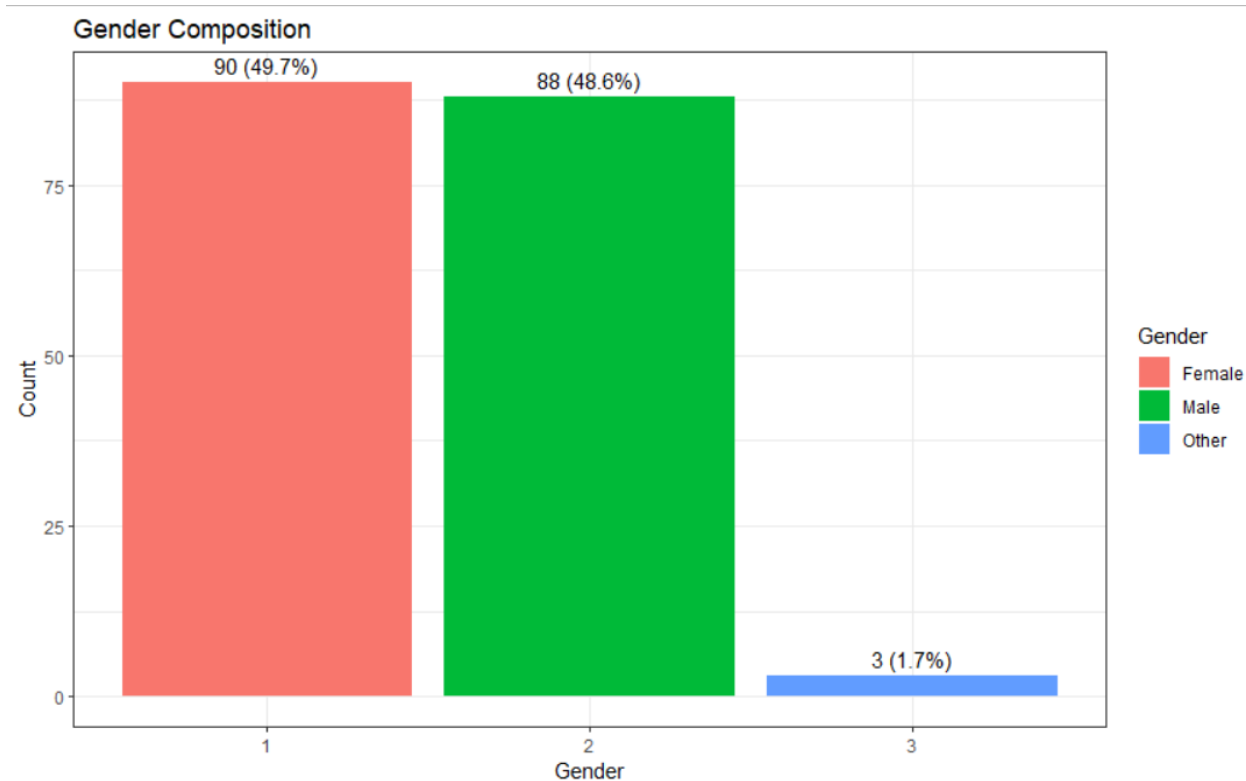
Remembering someone's actions is recalling their **past behavior**

Duration

Boxplot for Survey Duration

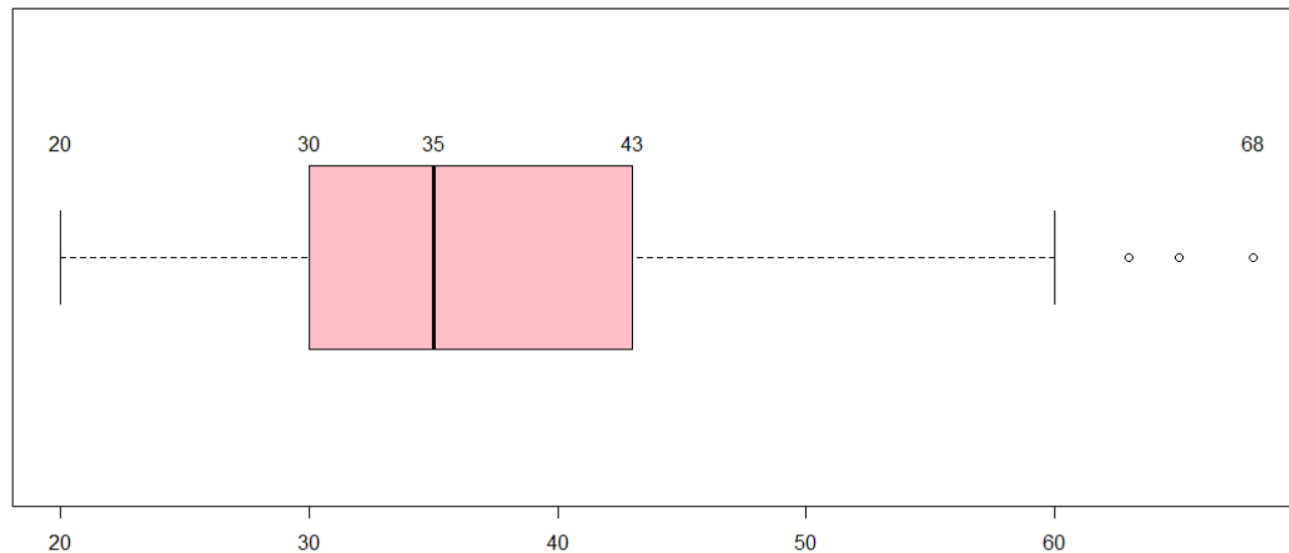


Respondent Gender

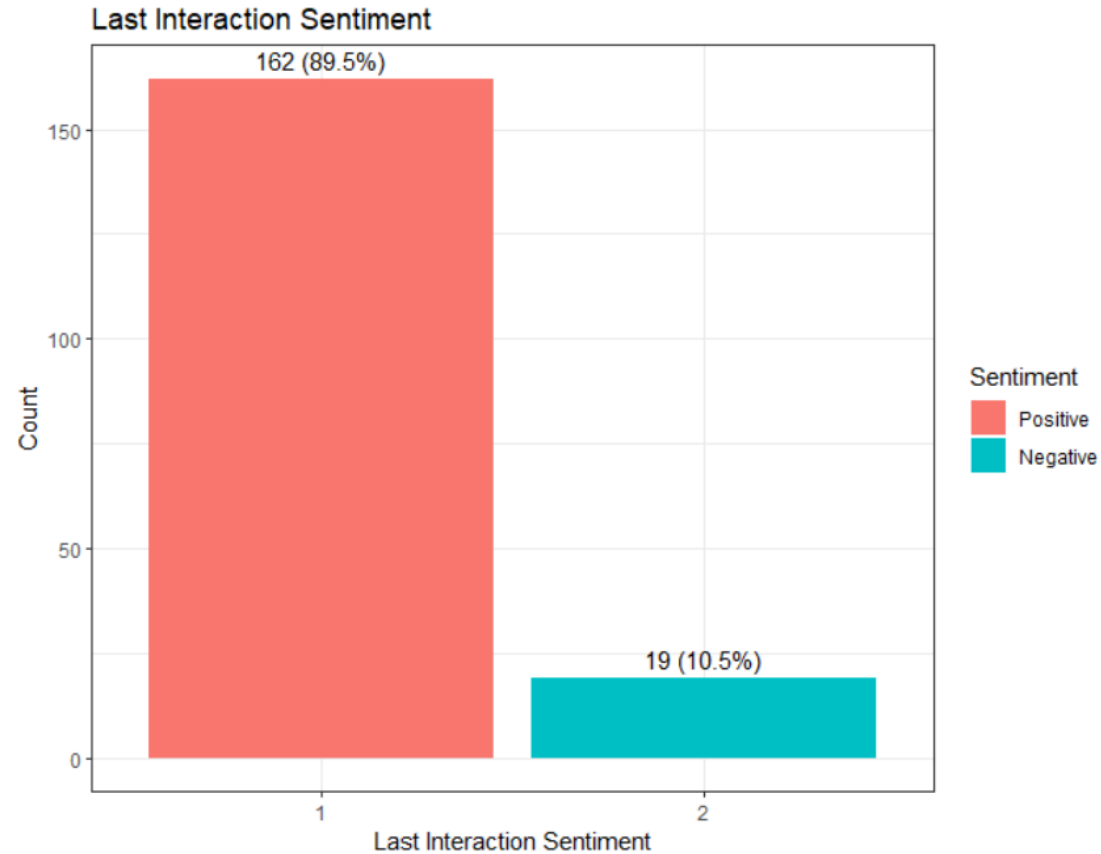


Respondent Age

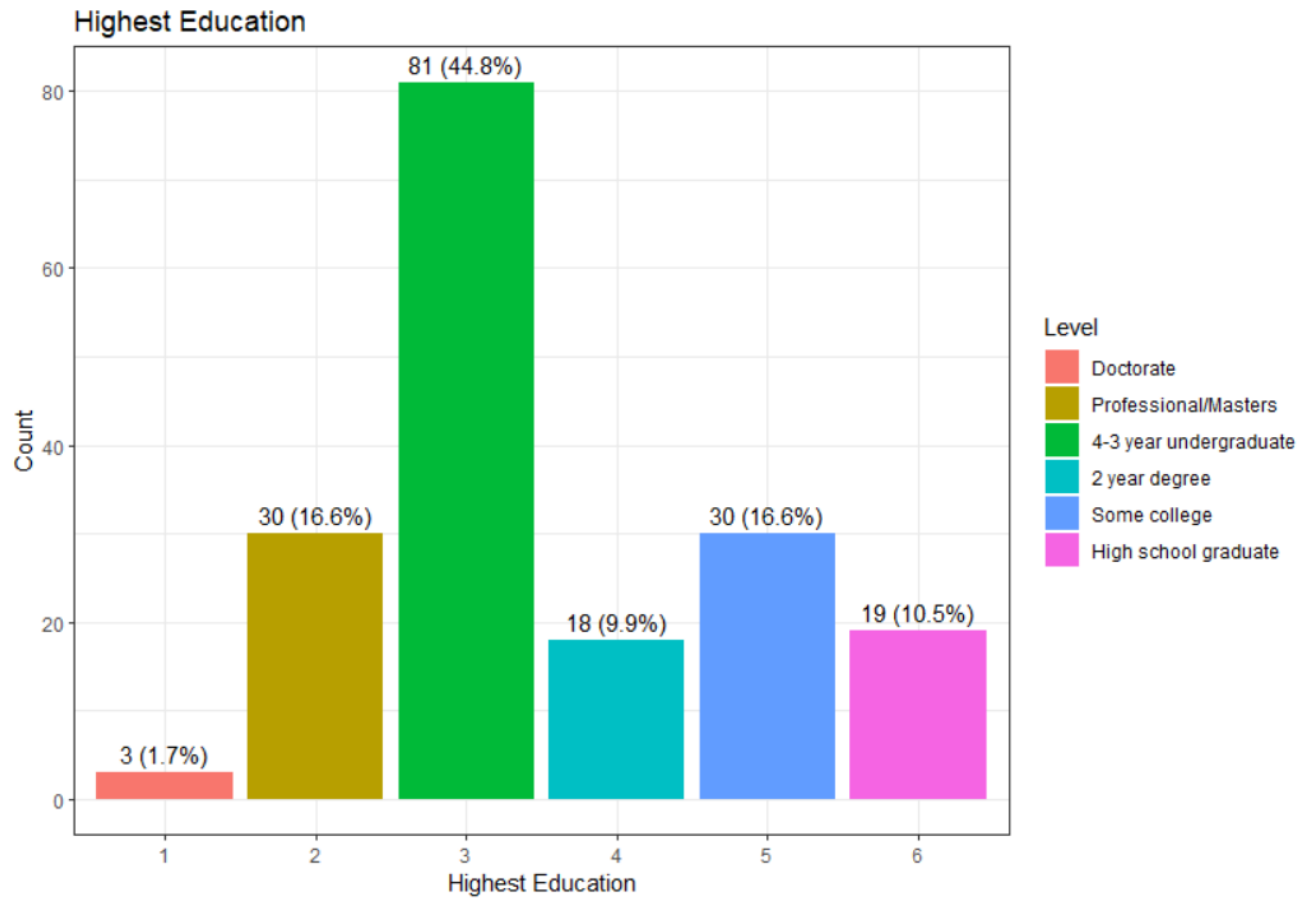
Boxplot for Age



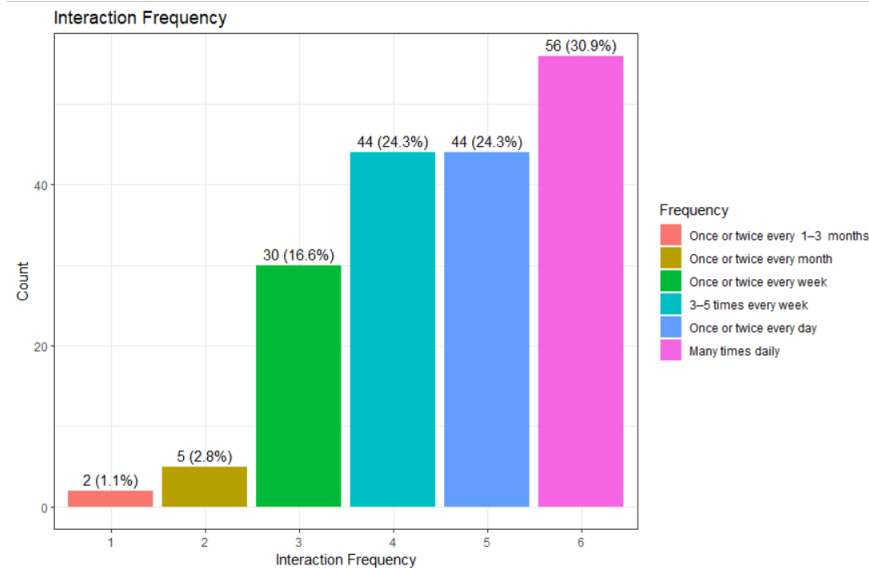
Last Interaction Sentiment



Education Level

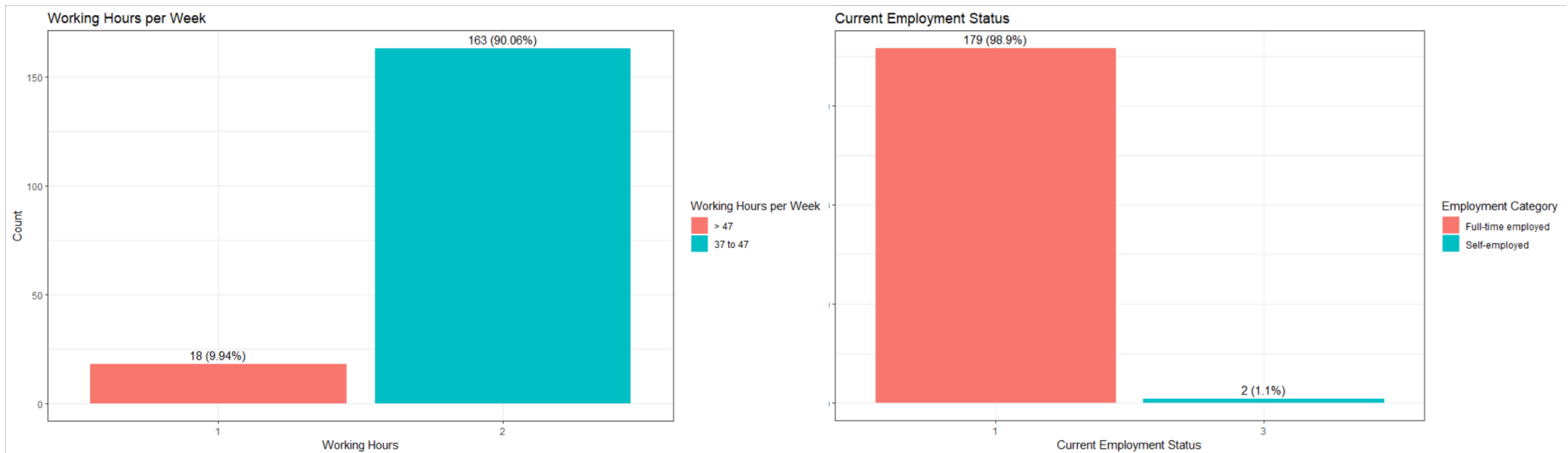


Interaction Frequency

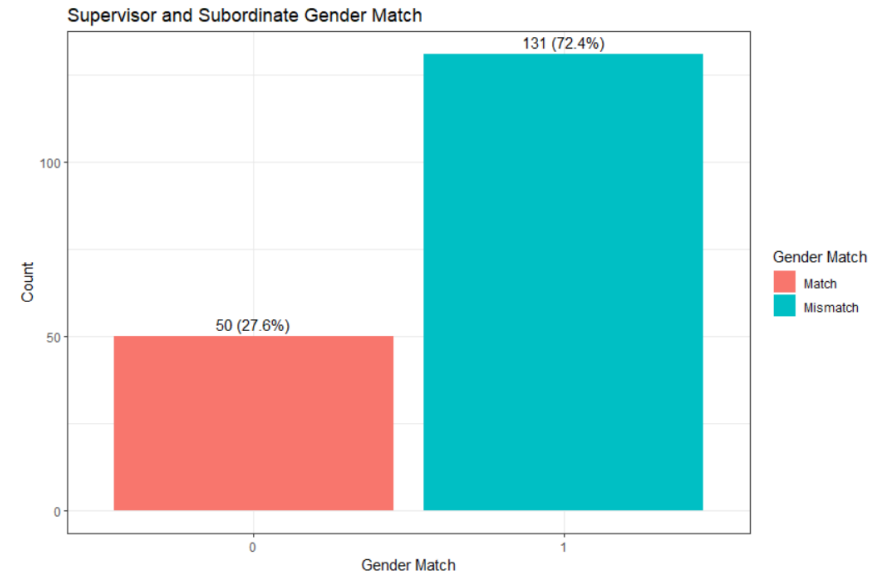
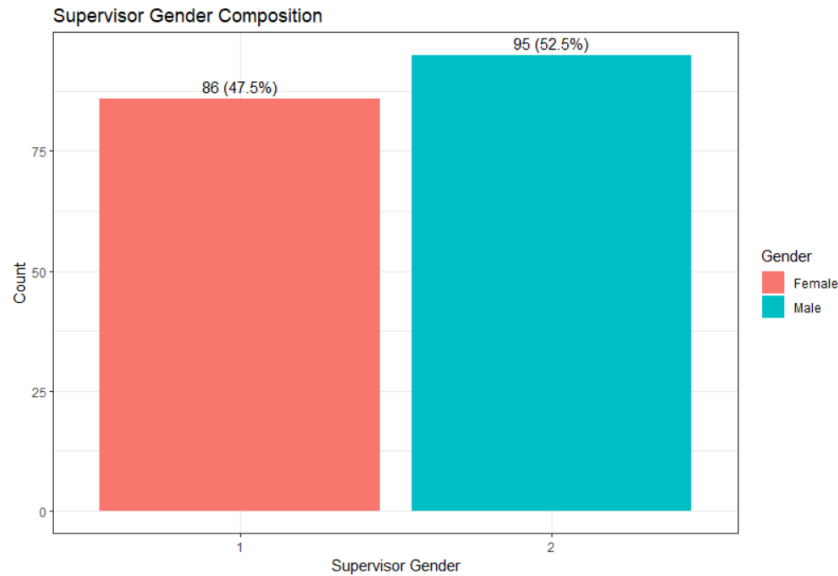


	Mean	SD
Interaction Frequency	4.61 (daily)	1.22

Respondent Employment Status



Supervisor Gender Gender Match



Level of Management

