

Comprehension of facial-expression emotions by children with SLI



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Introduction

- Nelson (1998) defined *language disorders* as a diverse group of either developmental or acquired disabilities primarily illustrated by deficits in comprehension, production, and/or spoken use of language.
- Children with SLI commonly demonstrate a lack of social competence (Ford & Milosky, 2003; McCabe & Meller, 2004; Spackmann et al., 2005).
- It is uncertain if poor social skills of children with SLI are due only to their language impairment, or if some other deficit, such as misreading nonverbal facial-expression emotions may also play a role.

Emotion Identification in Isolation

- Children with learning disabilities were slightly less accurate than normally developing children at interpreting facial expressions – but overall difference between the groups not significant (Holder & Kirkpatrick, 2001; Petti et al, 2003; Spackman et al., 2005) (Some differences in specific emotions)
- Dimitrovsky (1998) found conflicting results – children with language impairment were significantly less accurate in identifying emotions.
- Children with language impairment (LI) had significantly slower response times than non-learning disabled children when identifying certain emotions (Spackman et al., 2005)



Emotion Identification in Context

- Ford and Milosky, (2003) and Spackman et al., (2006)
- Children with LI displayed more difficulty in explaining emotions given a social scene
- Children with LI were rated significantly lower than matched controls when asked to supply emotional reasoning
- Both studies found significant differences between the language groups in their ability to draw emotional inferences



Purpose

- To evaluate how children with SLI/LLD comprehend nonverbal facial-expression emotions in and out of social contexts



Research Questions

- Is there a difference in the comprehension of nonverbal facial-expression emotions in children with SLI vs. typically developing children?
- Is there a difference in the ability of children with SLI to comprehend nonverbal facial-expression emotions in isolation and within a situational context?
- Comparative group research design



Participant Selection

- 7 children with SLI and 7 typically developing children
- Average IQ
- Typical hearing and vision
- SLI group-
 - Diagnosed with language impairment
 - Receiving speech-language services
- Typically developing group-
 - Classmate of the same age and gender
 - No identified language problems

Participants

Part.	Age	Grade	Gender	Lang. Diag.	CASL
S1	9yrs	4 th	Male	SLI/LLD	81.00*
S2	9yrs	4 th	Female	SLI/LLD	74.00*
S3	10yrs	5 th	Male	SLI/LLD	89.00
S4	12yrs	5 th	Female	SLI/LLD	70.00**
S5	9yrs	3 rd	Male	SLI/LLD	74.00*
S6	11yrs	5 th	Male	SLI/LLD	81.00*
S7	8yrs	3 rd	Female	SLI/LLD	78.00*
Mean	9.71				78.14*
C1	9yrs	4 th	Male	Typical	97.00
C2	10yrs	4 th	Female	Typical	112.00
C3	10yrs	5 th	Male	Typical	107.00
C4	10yrs	5 th	Female	Typical	102.00
C5	8yrs	3 rd	Male	Typical	74.00*
C6	11yrs	5 th	Male	Typical	100.00
C7	8yrs	3 rd	Female	Typical	109.00
Mean	9.43				100.14

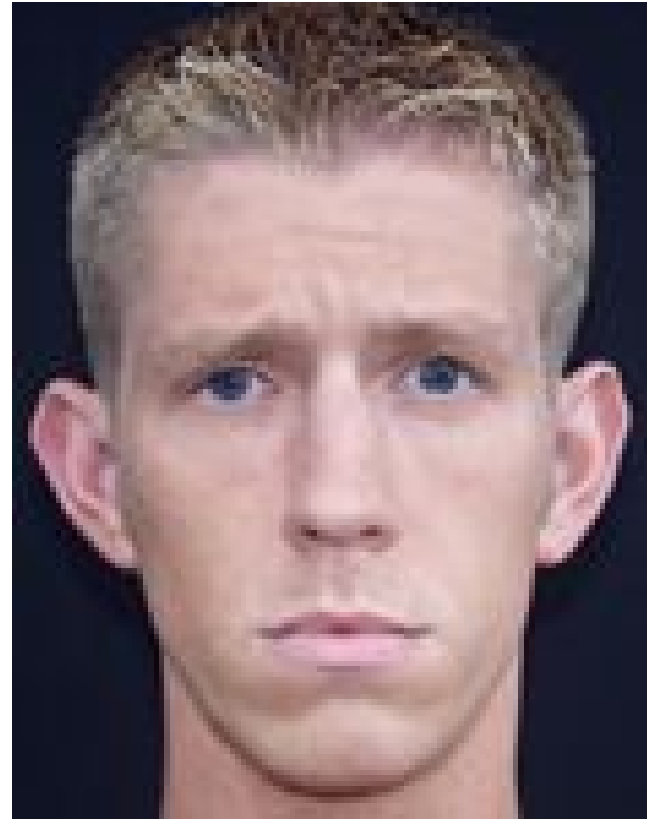


Dependent Variables

- *Diagnostic Analysis of Nonverbal Accuracy Revised (DANVA-2)*
 - Used to evaluate comprehension of facial expression in isolation
 - *Happy, Sad, Angry, and Fearful*
- **Pictured Social Situations Task**
 - Used to assess comprehension of emotion in a pictured context
 - *Happy, Sad, Angry, and Fearful*

DANVA-2

- Subtests
 - Adult Faces-2
 - Child Faces-2
- 48 total slides
- Data Analysis
 - Descriptive Comparisons
 - Analysis of variance (ANOVA) measures



Happy

Sad

Angry

Fearful

Pictured Social Situation Task

- Line-drawn picture cards
- 16 total scenes
- 2-3 Sentence stories
- 3 Questions
 - How does the character feel?
 - *Why* does the character feel that emotion?
 - *How* did the participant know the character felt that emotion?
- 4-point rating scale
- Data Analysis

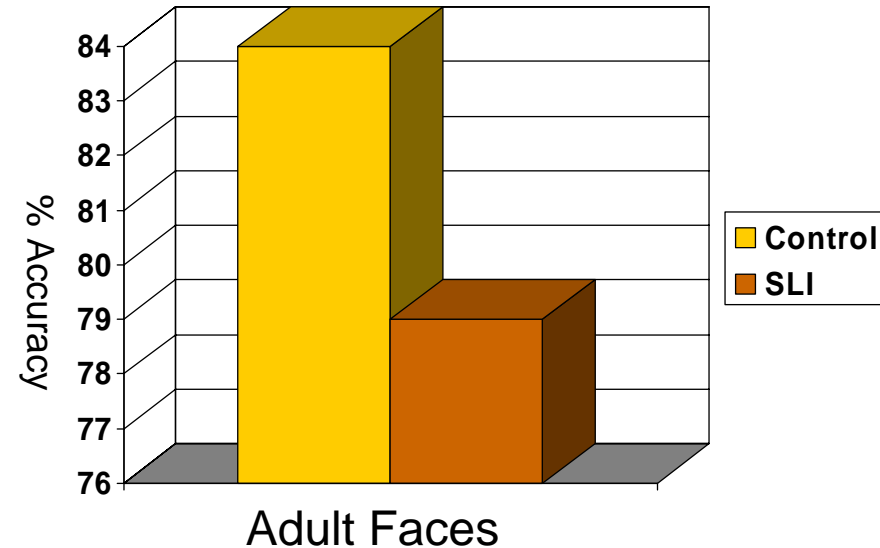
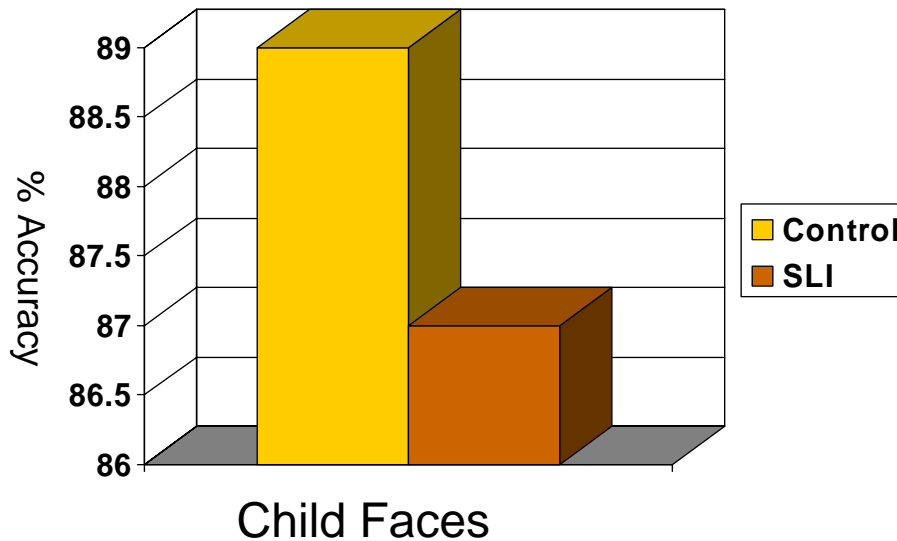


Mark likes scratch-n-sniff star stickers. John is sharing some of his stickers with Mark. How does Mark feel? Why does Mark feel ____? How do you know Mark feels ____?

Four Point Rating Scale

Rating	Purpose/Use of Language	Example
4	<ul style="list-style-type: none">-To discover, interpret, predict, or conclude-To describe multiple nonverbal sources of emotion	<ul style="list-style-type: none">-“Because his friend is doing a kind thing”-“Because John is holding the stickers out and Mark looks really happy”
3	<ul style="list-style-type: none">-To infer new factual information-To describe one source of nonverbal information	<ul style="list-style-type: none">-“Because his stickers smell so good”-“Because he’s got a smile on his face”
2	<ul style="list-style-type: none">-To restate given information-To refer to source of emotion only	<ul style="list-style-type: none">-“Because Mark is sharing stickers”-“His face looks like it”
1	<ul style="list-style-type: none">-No response, or response is incorrect, irrelevant, or confabulated-No reference to any emotional content	<ul style="list-style-type: none">-“Um, I don’t know”

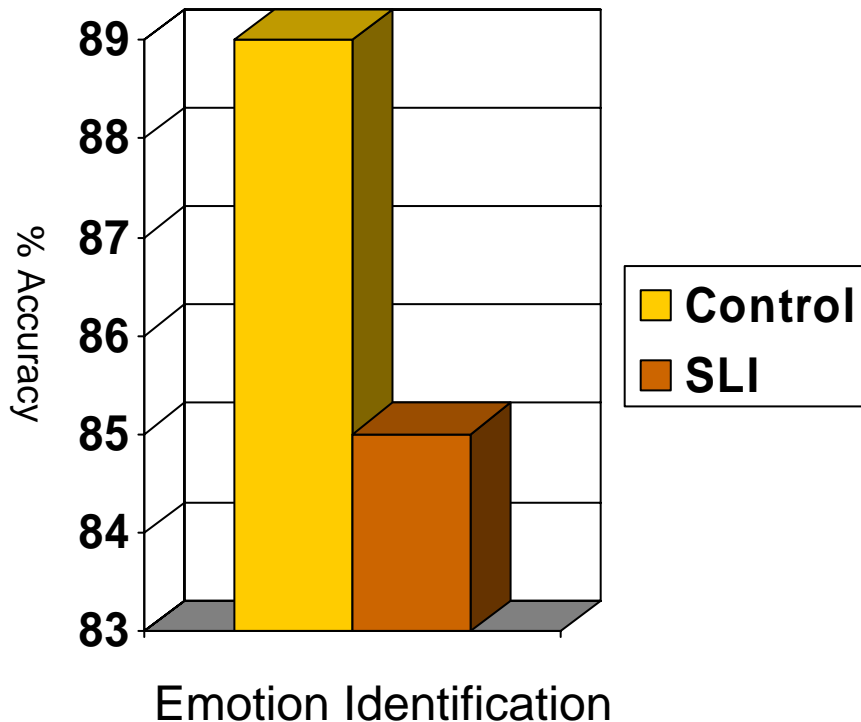
Results- DANVA-2



- % Accuracies
 - Control group- range 75%-96%
 - SLI group- range 67%-96%
- $p = .63$; ns

- % Accuracies
 - Control group- range 75%-88%
 - SLI group- range 67%-88%
- $p = .22$; ns

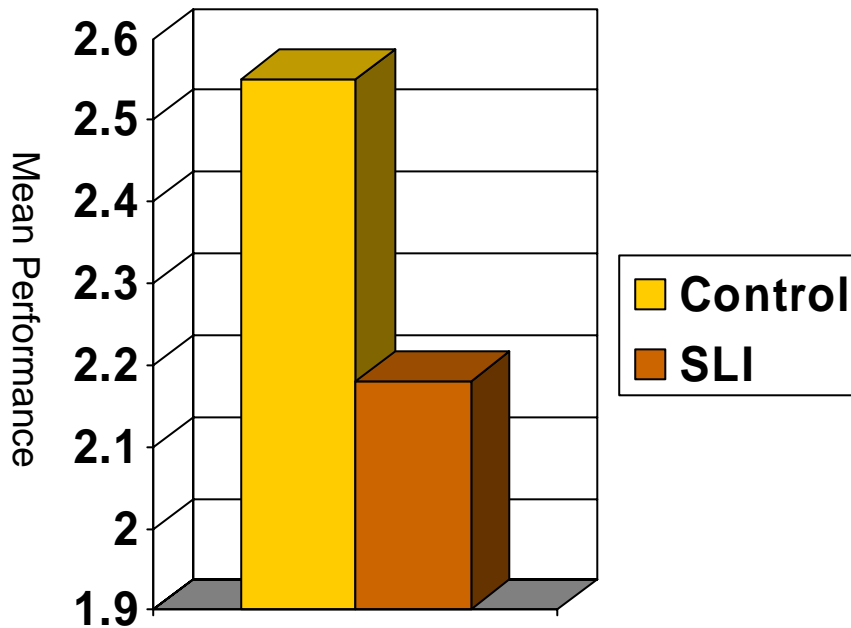
Results- Pictured Social Situation Emotion Identification



- Closed-ended question
- % Accuracies
 - Control group- range 75%-100%
 - SLI group- range 75%-94%
- $p = .43$; ns

Results- Pictured Social Situation Task

Why Open-ended Question

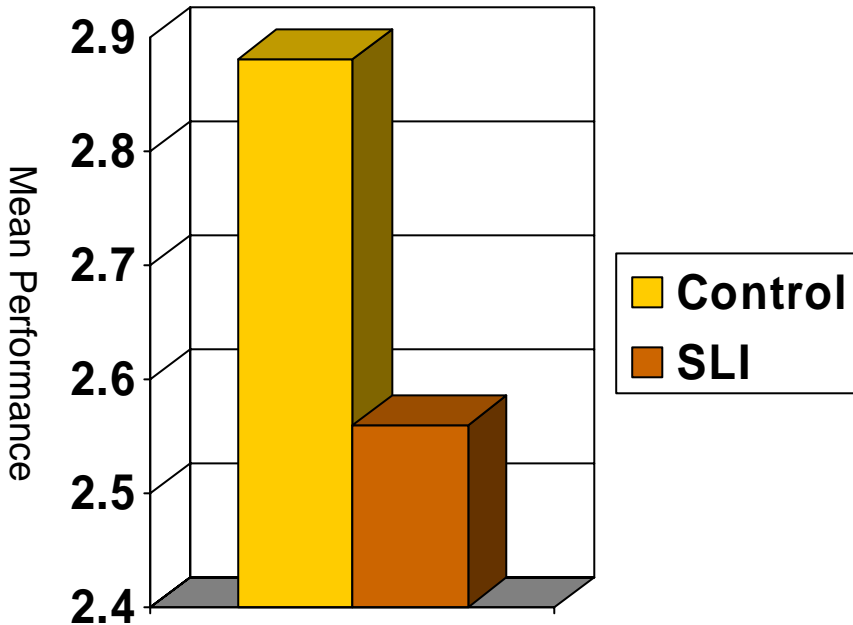


Task 2- *Why* open-ended question

- Mean Performance (out of 4.00 possible)
 - Control group- range 2.19-3.00
 - SLI group- range 1.81-2.63
- $p = .03$

Results- Pictured Social Situation Task

How open-ended Question



Task 2- How open-ended question

- Mean Performance (out of 4.00 possible)
 - Control group- range 2.25-3.19
 - SLI group- range 2.19-2.94
- $p = .10$; ns

Relation to past research

- Holder and Kirkpatrick (2001), Spackman et al. (2005), and Petti et al. (2003)
 - children with learning disabilities were slightly less accurate than normally developing children at interpreting isolated facial expressions depicted in photographs
- Ford and Milosky, (2003) , Spackman et al., (2006), and Holder & Kirkpatrick (2001)
 - children with SLI were ranked significantly lower than matched controls when asked to supply emotional reasoning
 - children with language impairment (LI) had significantly slower response times than non-learning disabled children



Limitations of the Research

- Low number of participants
- Participant outliers
- Use of researcher-created test for one assessment condition



Need for Future Research

- Larger number of participants
- Children in the SLI group subdivided into syntactic/morphologic vs. semantic/pragmatic deficits
- Reference points that children with SLI utilize in order to identify nonverbal information and draw emotional inferences (facial cues, body language, the entire social situation)
- Effective treatment technique to facilitate accurate perception of nonverbal information and explanation of emotional insights in social situations

References

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- Spackman, M., Fujiki, M., Brinton, B., Nelson, D. & Allen, J. (2005). The ability of children with language impairment to recognize emotion conveyed by facial expression and music. *Communication Disorders Quarterly, 26*, 131-143.
- Spackman, M., Fujiki, M., & Brinton, B. (2006). Understanding emotions in context: the effects of language impairment on children's ability to infer emotional reactions. *International Journal of Language and Communication Disorders, 41*, 173-188.

Questions



Child/Group		Happy	Sad	Angry	Fearful	Total	Percent Accuracy
SLI Group							
	S1	6.00	5.00	5.00	3.00	19.00	0.79
	S2	6.00	6.00	5.00	6.00	23.00	0.96
	S3	6.00	6.00	5.00	6.00	23.00	0.96
	S4	6.00	5.00	5.00	6.00	22.00	0.92
	S5	6.00	6.00	4.00	6.00	22.00	0.92
	S6	6.00	6.00	4.00	5.00	21.00	0.88
	S7	4.00	5.00	3.00	4.00	16.00	0.67
	SLI Group Mean (SD)	5.71(.76)	5.57(.53)	4.43(.79)	5.14(1.21)	20.86(2.54)	.87(.11)
	C1	6.00	6.00	4.00	6.00	22.00	0.92
	C2	5.00	6.00	6.00	6.00	23.00	0.96
	C3	5.00	6.00	5.00	6.00	22.00	0.92
	C4	5.00	6.00	5.00	6.00	22.00	0.92
	C5	6.00	6.00	3.00	6.00	21.00	0.88
	C6	5.00	4.00	4.00	5.00	18.00	0.75
	C7	6.00	6.00	4.00	6.00	22.00	0.92
	Control Group Mean (SD)	5.43(.53)	5.71(.76)	4.43(.98)	5.86(.38)	21.43(1.62)	.89(.07)
	Significance	p = .43	p = .69	p = .99	p = .16	p = .63	

Emotion recognition of Child Faces, from the DANVA-2, by children with SLI and children with typical language

	Child/Group	Happy	Sad	Angry	Fearful	Total	Percent Accuracy
	<i>Emotion recognition of Adult Faces, from the DANVA-2, by children with SLI and children with typical language</i>						
	SLI Group						
	S1	6.00	4.00	5.00	3.00	18.00	0.75
	S2	6.00	6.00	4.00	5.00	21.00	0.88
	S3	6.00	5.00	4.00	6.00	21.00	0.88
	S4	5.00	5.00	5.00	6.00	21.00	0.88
	S5	5.00	3.00	5.00	4.00	17.00	0.71
	S6	6.00	4.00	3.00	6.00	19.00	0.79
	S7	4.00	5.00	3.00	4.00	16.00	0.67
	SLI Group Mean (SD)	5.43(.79)	4.57(.98)	4.14(.90)	4.86(1.21)	19.00(2.08)	.79(.09)
	C1	6.00	5.00	5.00	5.00	21.00	0.88
	C2	5.00	6.00	5.00	4.00	20.00	0.83
	C3	5.00	5.00	6.00	5.00	21.00	0.88
	C4	6.00	4.00	6.00	5.00	21.00	0.88
	C5	5.00	6.00	5.00	4.00	20.00	0.83
	C6	5.00	6.00	3.00	6.00	20.00	0.83
	C7	6.00	6.00	2.00	4.00	18.00	0.75
	Control Group Mean (SD)	5.43(.53)	5.43(.79)	4.57(1.51)	4.71(.76)	20.14(1.07)	.84(.05)
	Significance	p = .99	p = .10	p = .53	p = .80	p = .22	

	Child/Group	Happy	Sad	Angry	Fearful	Total	Percent Accuracy
	SLI Group						
	S1	4.00	3.00	3.00	4.00	14.00	0.88
	S2	4.00	3.00	3.00	4.00	14.00	0.88
	S3	4.00	4.00	3.00	4.00	15.00	0.94
	S4	4.00	4.00	3.00	4.00	15.00	0.94
	S5	4.00	3.00	2.00	3.00	12.00	0.75
	S6	4.00	3.00	3.00	2.00	12.00	0.75
	S7	4.00	4.00	3.00	2.00	13.00	0.81
	SLI Group Mean (SD)	4.00(.00)	3.43(.53)	2.86(.38)	3.29(.95)	13.57(1.27)	.85(.08)
	C1	4.00	3.00	3.00	4.00	14.00	0.88
	C2	4.00	4.00	3.00	4.00	15.00	0.94
	C3	4.00	2.00	4.00	4.00	14.00	0.88
	C4	4.00	4.00	4.00	4.00	16.00	1.00
	C5	4.00	2.00	2.00	4.00	12.00	0.75
	C6	4.00	4.00	3.00	4.00	15.00	0.94
	C7	4.00	3.00	2.00	4.00	13.00	0.81
	Control Group Mean (SD)	4.00(.00)	3.14(.90)	3.00(.82)	4.00(.00)	14.14(1.35)	.89(.08)
	Significance		p = .48	p = .68	p = .07	p = .43	
<i>Emotion identification (responses from the closed-ended questions) from the pictured social situations by children with SLI and children with typical language</i>							

*Quality of responses to
Why open-ended
questions (explaining
why an emotion
occurred) in the pictured
social situation task*

Child/Group	Happy	Sad	Angry	Fearful	Total
SLI Group					
S1	2.25	2.00	2.25	4.00	2.63
S2	1.75	2.50	2.25	2.50	2.25
S3	2.50	2.00	2.00	2.50	2.25
S4	1.50	1.50	1.25	3.00	1.81
S5	2.00	2.75	1.75	2.25	2.19
S6	2.25	2.00	1.75	1.75	1.94
S7	2.50	2.00	1.75	2.50	2.19
SLI Group Mean (SD)	2.11(.38)	2.11(.40)	1.86(.35)	2.64(.70)	2.18(.26)
Control Group					
C1	3.75	2.25	2.25	3.50	2.94
C2	2.25	2.25	2.50	2.50	2.38
C3	2.50	2.75	2.00	2.75	2.50
C4	3.25	3.25	3.00	2.50	3.00
C5	2.50	2.50	2.25	2.00	2.31
C6	3.00	2.00	2.00	1.75	2.19
C7	2.75	2.00	2.00	3.50	2.56
Control Group Mean (SD)	2.86(.52)	2.43(.45)	2.29(.37)	2.64(.67)	2.55(.31)
Significance	p = .01	p = .19	p = .05	p = 1.0	p = .03

*Quality of responses to
How open-ended
questions (explaining
how an emotion
was inferred) in the
pictured social situation
task*

Child/Group	Happy	Sad	Angry	Fearful	Total
SLI Group					
S1	2.50	3.00	3.00	3.00	2.88
S2	3.25	3.25	2.00	3.25	2.94
S3	2.25	2.00	1.50	3.00	2.19
S4	2.25	3.00	2.25	2.25	2.44
S5	2.50	2.25	2.25	2.00	2.25
S6	3.00	2.25	2.50	3.00	2.69
S7	2.50	2.75	2.50	2.50	2.56
SLI Group Mean (SD)	2.61(.38)	2.64(.48)	2.29(.47)	2.71(.47)	2.56(.29)
C1	2.25	2.75	2.50	2.50	2.50
C2	3.00	3.00	3.00	3.00	3.00
C3	3.00	3.50	3.00	3.25	3.19
C4	3.00	2.75	3.00	3.00	2.94
C5	2.75	2.50	1.75	2.00	2.25
C6	3.00	3.00	3.00	3.25	3.06
C7	3.25	3.25	3.00	3.25	3.19
Control Group Mean (SD)	2.89(.32)	2.96(.34)	2.75(.48)	2.89(.48)	2.88(.36)
Significance	p= .15	p= .17	p= .10	p= .50	p= .10