The nature of early memories:

A preliminary investigation into the overlooked modalities of visual perspective and specificity in autobiographical memory.

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Abstract

Different control groups based on characteristics such as gender and personality types, exhibit various unexplained differences in autobiographic memory, such as phenomenological qualities, average age of recollection, speed in producing memories. The present study is a preliminary investigation into the overlooked variables of visual perspective and specificity of memories to see if explore the suggestion the un-cued early memories exhibit bias, as a possible avenue to explain differences in recall between groups. Age and emotional valance were also recorded. Ten mixed-demographic students free-recalled ten memories, though other than a slight bias towards specificity, no significance was found in any of the conditions.

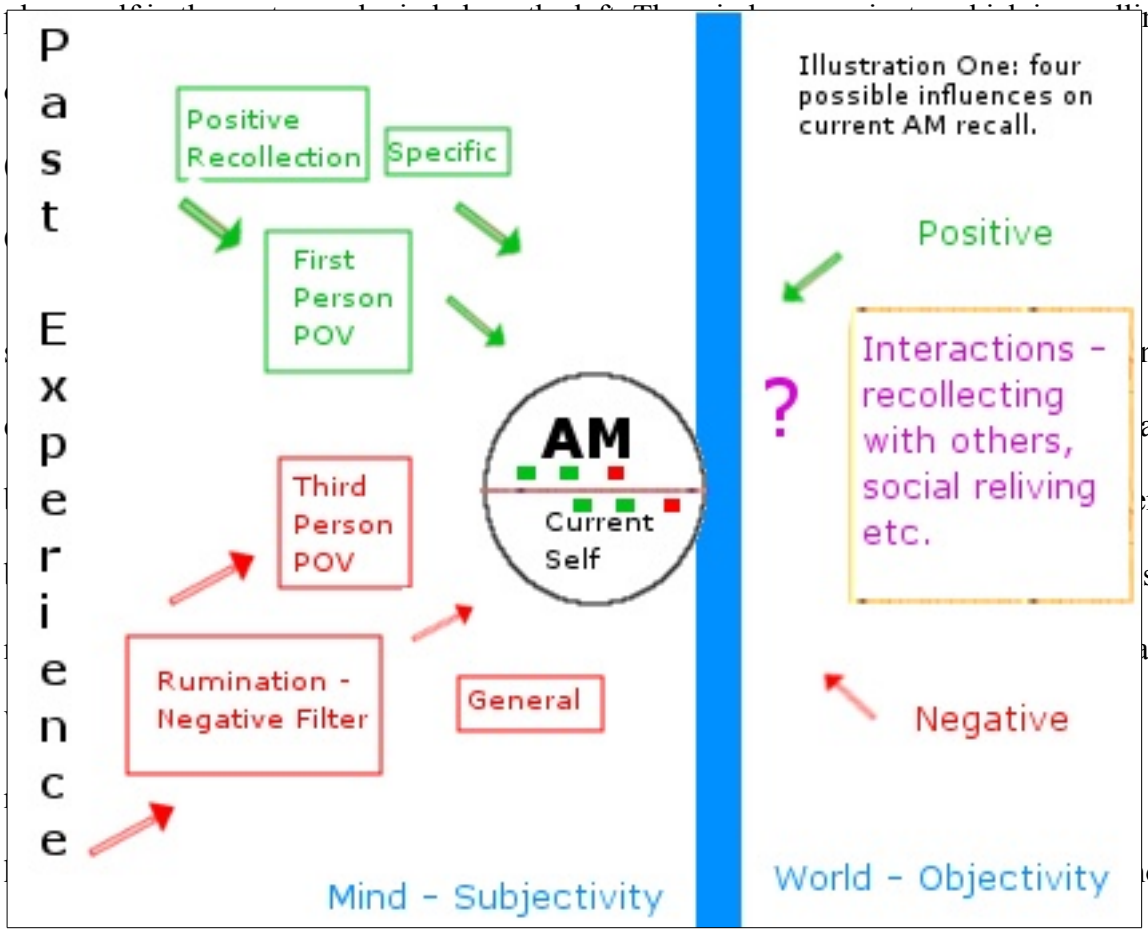
1. Introduction

Since the 1800's, research into autobiographical memory has resulted in four main areas of inquiry. Childhood amnesia and recency – the first period of childhood is generally forgotten, and more is remembered from the recent past, with memories less relevant to goals tending for fade (Conway and Holmes, 2010). This could possibly be because there is no inclination to dwell on or elaborate the irrelevant, and this dwelling/elaboration/frequency of recall

seems to be central to which memories are encoded for long-term storage. Another main area of research is the reminiscence bump (RB), meaning that more memories are encoded from one, fairly early, period in life. This could be due to various novel experiences or self-defining memories from this period receiving more elaboration/frequency of recall than later or earlier life, though RB exists not only for memories but also for things such as public events (Holmes and Conway, cited in Conway and Holmes, 2010, p232). Another research area is lifespan periods and the role of lifestory, themes and self-defining memories, which are essentially, selected autobiographical memories. Of course, the actual mechanism of this selecting is theorised in the concept of a working-self (Tulving, cited in Conway and Holmes, 2010, p242), yet recalling them is resource hungry and the working-self selects personal memories congruent with the current sense of self (and its goals) and makes them more accessible, strengthened by elaboration. So, in broadly considering this subject, a very large part of the issue would appear to be the elaboration and then the retrieval of certain memories and the aspects of cognition around this process.

The main focus of research has tended to concentrate on the age of memories, how easily they are recalled - then noticed the differences between certain groups (such as gender) without definitively explaining them; the subjective ontology is ostensibly confounded by a lack of quantifiable variables. Yet by looking at the experience and the method cognition uses to filter and distort autobiographical memory (AM) for current self-congruency, overlooked variables become apparent and new areas of cognitive study emerge. The depth of encoding is essentially how often the memories are recalled, either within the mind, such as when ruminating (reliving the past putting self in a negative light), or in interactions, for example: discussing the past with others. It seems that the cognitive process which does this recalling not only selects which memories are elaborated - they can also be strengthened or weakened

depending on the modalities of recall, for the purpose of being congruent with the current self and goals. First person perspective is more vivid (Nigro and Neisser, 1983), strengthens emotion (Talarico, Labar and Rubin,2004) and identification (Vogeley and Fink, 2003), as does recalling specific incidents - whereas when seeing oneself from a distance or recalling general over specific incidents, memories lose their power (Libby and Eibach, 2002). So perspective and specificity are a regulatory mechanism, shown in illustration one, which



does is support the fact that *the mind can ruminate, which is recalling oneself in the past in a negative light, causing people to encode more negative memories*?

So previous studies have found differences in recall between people and groups, the variables of memories themselves might help explain these differences as different processes lead to different encoding. Presumably, recalling oneself in a positive light (as opposed to

rumination) leads to first person specific recall. So subjectively, recall has positive and negative processes leading to differences in encoding. Does recall in response to objective interactions, 'environmental elaboration' lead to a specific kind of recall, or does it depend on context? Is it simply frequency that changes modality? If early AM showed significant difference in recall of modalities, it might explain the differences between groups, which could be due to the social aspect. For example, Calmes and Roberts (2008) found that women both ruminate and discuss the past more - which might explain women's AM being more vivid and easier to recall (Mullen, cited in Rubin, Schulkind & Tamara, 1999 p.63) containing more references to others (Bauer, Stennes and Haight, 2003) and being recounted with more emotion words (Adams, Kuebli, Boyle and Fivush, 1995). Is that difference learned? Reese and Fivush (cited in Goddard, Pring and Felmingham, 2005, P81), found that women talked more about emotions to daughters. Simonson, Mezulis and Davis. (2011) found that when men do ruminate, it's more about goal stressors, but women relationship stressors. So it might be that the differences in upbringings orientate the retrieval and elaboration process in different areas that are significant in different periods in life and receive elaboration in different ways depending on socially constructed factors.

So differences between the retrieval and elaboration process may be taught in childhood. It's also possible that the subjective experience of AM is the same for all people and the difference is in the methodology of self-reporting, responses of which can be linked to personality (Schermer, Johnson, Vernon, and Jang, 2011). Benyamin, Leventhal and Leventhal (2000) found that self-report health questionnaires are accurate predictors of longevity only for men as males report the serious (are more censorious in reporting) and women report all illnesses (are more inclusive in reporting), suggesting that males are taught not to discuss details or more minor things (yet still experiencing the same), and so gender

difference could be down to dialectics and communication rather than difference in autobiographical memory. With these caveats in mind, the present study can be considered a preliminary investigation into the overlooked but quantifiable variables of POV and specificity of early memories generally, to possibly begin to explain differences in recall between groups and suggest ideas for further research. It seems logical to assume that current self and goals are founded on positive, specific incidents in the past, therefore the study predicts:

h1: The number of specific memories recalled will be significantly higher than the number of general memories recalled.

h2: The number of memories in the first person perspective will be significantly higher than the number of observer perspective memories recalled.

h3: When memories are recalled in the first person perspective, the chance of the same memory being specific rather than general rises beyond a point of significance. On the other hand, within the memories that are categorized as 'third person' memories, there will be a heightened chance of those memories also being classed as ‘general’ rather than specific.

2. Method

2.1 Participants

Ten Open University psychology students were recruited through their course website. Exact demographic groups were neither requested nor documented due to the study being focused

on memories themselves.Whatever is involved in the research, the age range/mean age and gender ratio of the sample always helps the reader to assess the relevance to a population.

2.2 Design

The current work is considered a preliminary study into a neglected area, and had the non-conventional between participants design of four independent variables on two levels, i.e. the categories the uncued memories (DV) could fit into: specific first person; specific third person; general first person; general third person.

2.3 Apparatus and Materials

The experiment consisted of a three page Microsoft word document which participants could edit. The first page provided the instructions, the second used for recording the DV, ten un-cued (free-recall) memories in a table with coding information at the end (1/3 - SPEC/GEN, then two empty cells (see appendix two), this encoding wasn't explained until the third page after the memories had been recorded.

2.3 Procedure

An initial pilot project consisted of both lines and a table to record the DV to see which people preferred, and included the categories of POV and specificity. Initial responders found the trial very easy and also preferred the table. As the design was unusual and the data produced might be difficult to statistically analyze at a later stage, it was decided to add two categories in case extra data was needed, thus the final version also recorded age and emotional valence of each memory.

In the trial proper, students downloaded the three page document. Read the instructions on page one, which were to free recall ten early memories and record them as keywords or phrases on the table on page two. No further instruction was given at this point.

Page three explained the two levels of point of view, and the meaning of specificity, and participants returned to the table and indicated two variables for each recorded memory by deleting one of the codewords for each (SPEC/GEN and 1/3). Also, in an adjacent two blank columns, the additional data for each memory was recorded by the participants, approximate age at time of memory, and the emotional valence on recall of the memory (on a scale of -5 to +5).

So at the end of the trial, the form had ten uncued early memories listed on it, together with the self-classified variables of: [SPECIFIC or GENERAL]; [FIRST or THIRD]; [APPROXIMATE AGE]; [EMOTIONAL VALENCE {-5-+5}].

The completed form was then saved and returned. Participants seemed to find it easy, with all ten returning within a few hours of being uploaded, with no errors.

3.0 Results

The four main conditions were analyzed by a two way ANOVA

Table One: Mean response times (and Standard deviations) for the four conditions.

N=10	First Person	Third Person	Sub-row means for specifity
Specific	**3.70 (2.541)**	**2.30 (2.003)**	3.00
General	**1.80 (1.549)**	**2.20 (1.751)**	2.00
Sub-column means for visual perspective	2.25	2.25	2.50

M ct of specificity.
(I 'point of view', which
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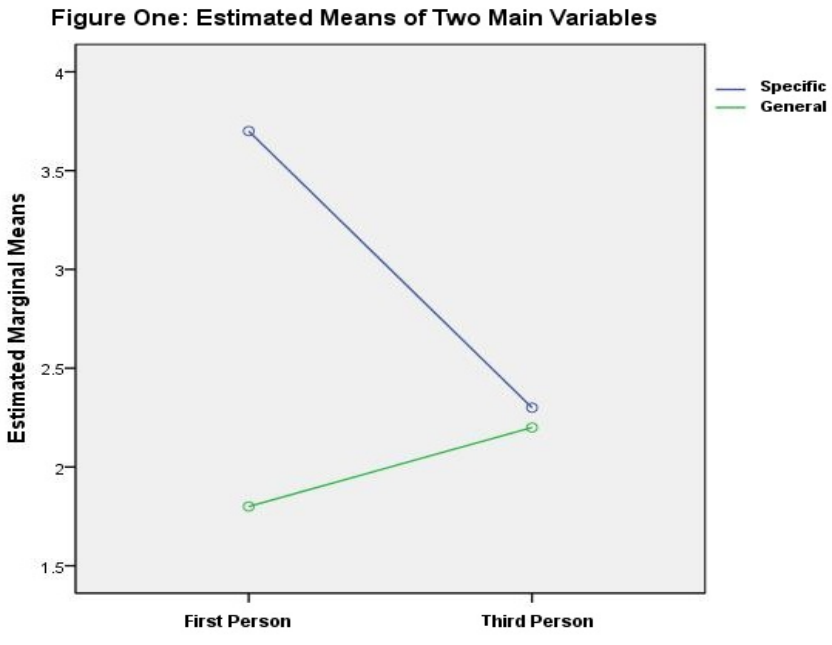
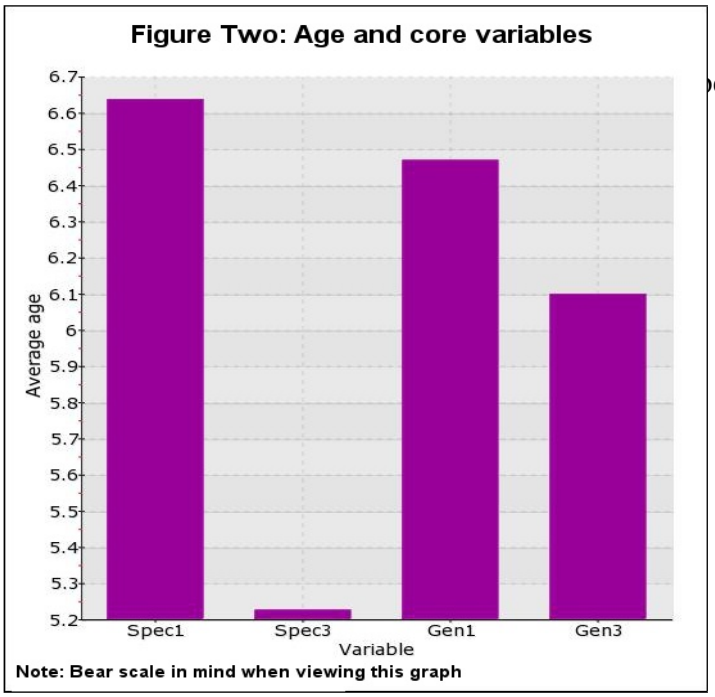
ir



F fference between them,
e: tly, and also the lack of
ir

3.

T ing emotion valance
li cificity (F(1,9)=0.282
P)=0.238), P>0.05).



bearing in mind the scale on the left of

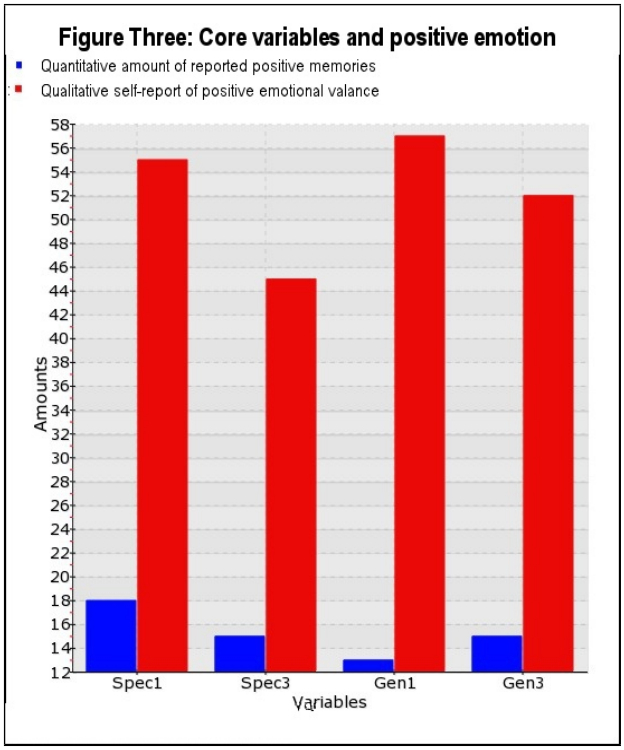
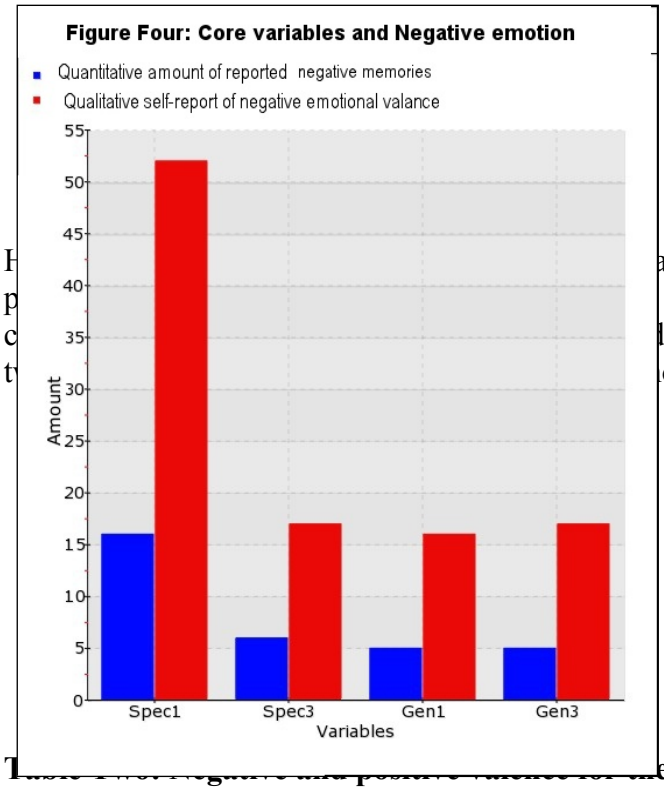


Figure Three: Positive valance showed no significance between variables.



H ate that specific memories in the first p high degree of negative valance, but this c l this variable the most reported (see table t ot significant.

T e four main variables

Variable	Positive Average	Negative Average
Spec1		-0.2
Spec3	+0.17	
Gen1	+1.08	
Gen3	+0.06	

Discussion

That specificity would be more frequent is perhaps obvious at first glance. It might suggest that uncued (and so more deeply encoded) memories are of self-defining events rather than periods of life. This finding might also suggest that rumination may not be a prominent aspect of the process encoding long-term memory in the non-clinical population (as it tends to encode general memories). It could suggest that the nature of early memories lean towards the positive, as first person perspective does not involve revision or avoidance (though this suggestion is somewhat modified by the auxiliary data). Of course, one question that hasn't been asked in the literature is, does retelling and recalling AM via interactions and discussions lead to third person recall as rumination does (as both are forms of re-living, one within and subjective and one outer and objective) or is reliving more likely to be positive and so lean towards first person specific encoding, or is it mixed, depending on context? Thus, the possibility is open that recall based on present, repeated interaction (parents recalling memories with children for example) causes first person encoding and recall which would [confirm (if found true)] [support] the finding by Reese and Fivush (cited in Goddard, Pring and Felmingham, 2005, P81), that women talk more with daughters about emotion. However, the current data might also suggest that the nature of the deepest memories are generally accurate and form a fairly permanent self-image, thus our goals grow from early experiences, rather than we grow and then have to revise our memories to be congruent with a new sense of self.

Of course, this line of reasoning is confounded by the fact that differences in POV of memories isn't significant and the null of H2 must be accepted [cannot be rejected]. The idea that POV is performing a similar function in early memory, of revision and filter, would mean that the result would have been significant if there had also been a significant interaction, towards the direction of *both* specific *and* general memories occouring together beyond chance, which isn't the case and the null of H3 is accepted,[cannot be rejected} therefore, all that can be said for certain about this core data is that the nature of early memories tends to be specific, but as the POV occurs equally as first or third it suggests that early memories are specific incidents, some of which are modified via POV, either to be congruent with current self or current goals.

To take a very brief look at the additional data, the age of memories doesn't seem to be significantly linked to the four conditions, nor positive emotions. There's a slight leaning towards specific first person negativity, not statistically significant, but bearing in mind the small sample size, this small leaning of the data might be worthy of further investigation.

There is possibly still scope for research, looking at the variables of memories themselves, to explain differences in recall between groups. As mentioned earlier, the effect on memory of retelling (in terms of POV and specificity) hasn't been considered. If a further study could find statistical significance to the possibility that negative experiences are easier to recall in first person perspective, then it might mean that easy recall of AM indicates difficult early experiences. There are many unanswered questions in this area generally, considering the two core variables, such as the effect on future selves (imagining oneself in the future), the effect of personality types on recall style. But at present, the only finding of

this initial exploratory study is that the nature of early memories tends towards the specific, and it is certainly possible to just see the data as it is here and say that the variables of POV and specificity aren't useful in considering differences in AM between groups as the nature of early memories is a roughly even mixture of fact, fiction and revision in all people.

Word Count: 2595

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A Brief Paraphrase of my Tutor's Response

- The abstract was OK but needed more detail about the mechanics of the research.
- The introduction lists research rather than assessing citations as evidence in an argument, i.e. there should have been less and the method and findings of the studies should have been described.
- The hypothesis was well presented.
- The design section was overcomplicated.
- The results section got off to a good start but initial figures should have been commented on.
- Anova and the graph were both presented OK. The additional graphs were unnecessary.
- The discussion fell down in its primary purpose in that there weren't links back to the studies in the introduction, discussing their findings in the context of the current results.

Appendix One – Initial SPSS output for main variables

```
GET
FILE='C:\Documents and Settings\ANT\Desktop\InputAttemptTHREE.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
GLM Spec1 Spec3 Gen1 Gen3
/WSFACTOR=Spec 2 Polynomial POV 2 Polynomial
/METHOD=SSTYPE(3)
/PLOT=PROFILE(Spec*POV)
/PRINT=DESCRIPTIVE
/CRITERIA=ALPHA(.05)
/WSDESIGN=Spec POV Spec*POV.
```

General Linear Model

Notes			
Output Created			24-Au
Comments			
Input	Data	C:\Documents and Settings\ANT\Desktop\InputAttemptTHREE.sav	
	Active Dataset	DataSet1	

	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	10
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		GLM Spec1 Spec3 Gen /WSFACTOR=Spec 2 I POV 2 Polynomial /METHOD=SSTYPE(3 /PLOT=PROFILE(Spec /PRINT=DESCRIPTIV /CRITERIA=ALPHA(. /WSDESIGN=Spec PO
Resources	Processor Time	00:00:01.047
	Elapsed Time	00:00:05.687

[DataSet1] C:\Documents and Settings\ANT\Desktop\InputAttemptTHREE.sav

Within-Subjects Factors		
Measure:MEASURE_1		
Spec	POV	Dependent Variable
1	1	Spec1
	2	Spec3
2	1	Gen1
	2	Gen3

Descriptive Statistics

	Mean	Std. Deviation	N
Spec1	3.70	2.541	10
Spec3	2.30	2.003	10
Gen1	1.80	1.549	10
Gen3	2.20	1.751	10

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error d
Spec	Pillai's Trace	.417	6.429[a]	1.000	9.000	.032
	Wilks' Lambda	.583	6.429[a]	1.000	9.000	.032
	Hotelling's Trace	.714	6.429[a]	1.000	9.000	.032
	Roy's Largest Root	.714	6.429[a]	1.000	9.000	.032
POV	Pillai's Trace	.035	.328[a]	1.000	9.000	.581
	Wilks' Lambda	.965	.328[a]	1.000	9.000	.581
	Hotelling's Trace	.036	.328[a]	1.000	9.000	.581
	Roy's Largest Root	.036	.328[a]	1.000	9.000	.581
Spec * POV	Pillai's Trace	.117	1.197[a]	1.000	9.000	.302
	Wilks' Lambda	.883	1.197[a]	1.000	9.000	.302
	Hotelling's Trace	.133	1.197[a]	1.000	9.000	.302
	Roy's Largest Root	.133	1.197[a]	1.000	9.000	.302

a. Exact statistic

b. Design: Intercept

Within Subjects Design: Spec + POV + Spec * POV

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect		Mauchly's W	Approx. Chi-Square	df	Sig.

dimension1	Spec	1.000	.000	0	.
	POV	1.000	.000	0	.
	Spec * POV	1.000	.000	0	.

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

b. Design: Intercept

Within Subjects Design: Spec + POV + Spec * POV

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect			Epsilon[a]		
			Greenhouse-Geisser	Huynh-Feldt	Lower-bound
dimension1	Spec	1.000	1.000	1.000	
	POV	1.000	1.000	1.000	
	Spec * POV	1.000	1.000	1.000	

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept

Within Subjects Design: Spec + POV + Spec * POV

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source			Type III Sum of Squares	df	Mea
Spec	Sphericity Assumed	10.000	1	10.000	
	Greenhouse-Geisser	10.000	1.000	10.000	
	Huynh-Feldt	10.000	1.000	10.000	
	Lower-bound	10.000	1.000	10.000	
Error(Spec)	Sphericity Assumed	14.000	9	1.556	

	Greenhouse-Geisser	14.000	9.000	1.556
	Huynh-Feldt	14.000	9.000	1.556
	Lower-bound	14.000	9.000	1.556
POV	Sphericity Assumed	2.500	1	2.500
	Greenhouse-Geisser	2.500	1.000	2.500
	Huynh-Feldt	2.500	1.000	2.500
	Lower-bound	2.500	1.000	2.500
Error(POV)	Sphericity Assumed	68.500	9	7.611
	Greenhouse-Geisser	68.500	9.000	7.611
	Huynh-Feldt	68.500	9.000	7.611
	Lower-bound	68.500	9.000	7.611
Spec * POV	Sphericity Assumed	8.100	1	8.100
	Greenhouse-Geisser	8.100	1.000	8.100
	Huynh-Feldt	8.100	1.000	8.100
	Lower-bound	8.100	1.000	8.100
Error(Spec*POV)	Sphericity Assumed	60.900	9	6.767
	Greenhouse-Geisser	60.900	9.000	6.767
	Huynh-Feldt	60.900	9.000	6.767
	Lower-bound	60.900	9.000	6.767

Tests of Within-Subjects Effects			
Measure:MEASURE_1			
Source		F	Sig.
Spec	Sphericity Assumed	6.429	.032
	Greenhouse-Geisser	6.429	.032
	Huynh-Feldt	6.429	.032
	Lower-bound	6.429	.032
POV	Sphericity Assumed	.328	.581
	Greenhouse-Geisser	.328	.581
	Huynh-Feldt	.328	.581
	Lower-bound	.328	.581
Spec * POV	Sphericity Assumed	1.197	.302
	Greenhouse-Geisser	1.197	.302
	Huynh-Feldt	1.197	.302
	Lower-bound	1.197	.302

Tests of Within-Subjects Contrasts							
Measure:MEASURE_1							
Source				POV	Type III Sum of	df	Mean Square

					Squares		
Spec		Linear			10.000	1	10.000
Error(Spec)		Linear			14.000	9	1.556
POV			dimension3	Linear	2.500	1	2.500
Error(POV)			dimension3	Linear	68.500	9	7.611
Spec * POV		Linear		Linear	8.100	1	8.100
Error(Spec*POV)		Linear		Linear	60.900	9	6.767

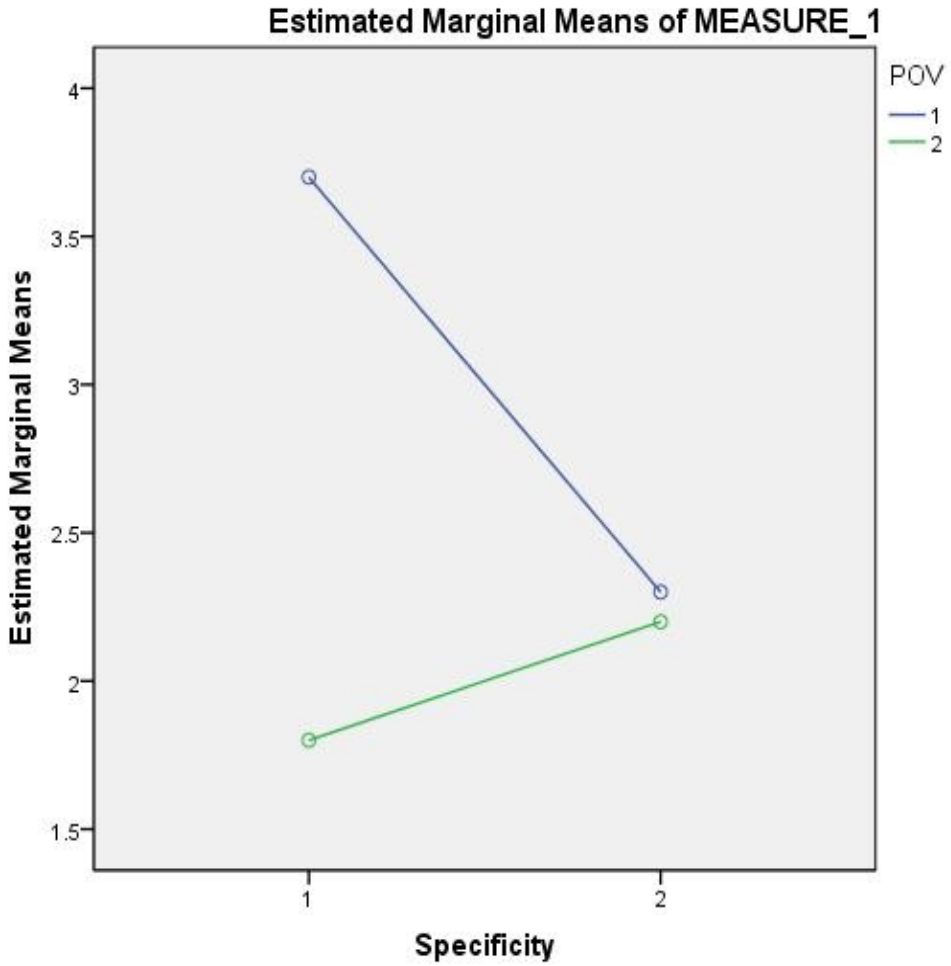
Tests of Between-Subjects Effects

Measure:MEASURE_1

Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	250.000	1	250.000	.	.
Error	.000	9	.000		

Profile Plots



Appendix Two – The experiment itself

The Nature of Early Memories

Thank you for choosing to take part in this experiment. It should take less than ten minutes. It's better if you don't read ahead but just follow the instructions sequentially. There are two sets of very simple instructions. Firstly, on the next page there is a table as shown below, which is followed by nine more rows.

	Memory Keyword		**A**	**E+/-5**
1		SPEC/GEN 1/3		

At this point just ignore the words and columns at the end.

The first instruction is this: simply recall ten early memories. At least earlier than ten years old. Just try and recall the earliest ten memories you have. Then note down some simple phrase or keyword to help you remember in the column marked 'Memory Keyword'. For example:

	Memory Keyword		**A**	**E+/-5**
1	Christmas in Bournemouth	SPEC/GEN 1/3		
2	Losing my scarf at school and being shouted at.	SPEC/GEN 1/3		

… and so on eight more times.

Before you start:

Please be aware that rarely, emotional issues can come up when recalling emotional memories. You have the right to withdraw from the study at any time before submitting the project back to me. After that your data will be anonymised, though a statistical record of your responses may be kept by either/both myself and the Open University. I am an undergraduate student of psychology studying the Open University course DD303, and not qualified to give any professional advice. For further details or for the DD303 course.

	Memory Keyword		A	E+/-5
1		SPEC/GEN 1/3		
2		SPEC/GEN 1/3		
3		SPEC/GEN 1/3		
4		SPEC/GEN 1/3		
5		SPEC/GEN 1/3		
6		SPEC/GEN 1/3		
7		SPEC/GEN 1/3		
8		SPEC/GEN 1/3		
9		SPEC/GEN 1/3		
10		SPEC/GEN 1/3		

Part Two

Almost finished. The last part is to add a little bit more information about the memories in the columns at the end.

First column (with spec/gen 1/3 written in it)

Firstly, the perspective. When you recall a memory it can be either recalled seeing through your eyes, as though you are back there (first person). Or, a memory can be recalled as though from a distance, looking down on yourself and seeing your body (third person). So, memories can be first or third person.

Memories can also be specific or general. A specific memory is of a single event that lasted for less than 24 hours, eg. losing a scarf at school and being told off. A general event is … a general event, such as Christmas in Bournemouth.

So now simply return to the ten memories you've noted, and delete the aspects that don't apply. For example, if a memory is in the first perspective, then delete the three on its line, and if a memory is of a specific memory, delete the GEN.

In other words, when you start out, each memory you noted has four possibilities in the first column. When you've finished, each memory will have two (from four possibilities) because you've deleted two:

1 Gen

3 Gen

1 Spec

3 Spec

eg

	Memory Keyword		A	E+/-5
1	Christmas in Bournemouth	GEN 3		
2	Losing my scarf at school and being shouted at.	SPEC/ 1/		

The next column (labelled A)

Very simple, your approximate age at the time of the memory (guesses are ok but no ranges)

The last column (labelled E+/-5)

You might have guessed this if you've already done a lot of experiments! Emotional valance, how emotionally positive or negative was the memory as it was recalled (rather than as it was originally happening. -5 to +5. So, -5 would be a horrible memory, a +1 a little bit positive and +5 a very happy memory (any number without a + or – will be considered positive as Word might not allow a + sign in the cell). So, an example of the finished entries?

	Memory Keyword		A	E+/-5
1	Christmas in Bournemouth	GEN 3	5	3
2	Losing my scarf at school and being shouted at.	SPEC/ 1/	6	-4

That's it. Now simply save the document and return it to me. **DON'T FORGET TO SAVE!**

Thank you!

Debreifing:

This study, as you may have guessed, is about the nature of early memories, and if the two aspects of Point of View and specificity might explain the different ways that various groups of people recall and experience their memories.

If there are any questions, please email me at info@alwaysjay.com. If you have any complaint you may contact the course head. Please leave any comments/advice below to help me improve my work in the future.

Thank you very much for your time.

Appendix Three - Original Data Returned - Complete

Participant Dataset 1

	Memory Keyword		**A**	**E+/-5**
1	Moving to Sutton	SPEC 1	3	3
2	First day at school	SPEC 1	4	2
3	My little brother being born	SPEC 1	4	4
4	Christmas on our own	GEN 1	6	-5
5	Leavers day at school	SPEC3	10	1
6	Getting my first pet	GEN 3	5	3
7	Collecting snails	SPEC 1	5	4
8	My brother cutting his head open	SPEC 1	7	-3
9	Moving again	GEN 3	6	-5
10	Being father christmas	SPEC 1	8	2

Participant Dataset 2

	Memory Keyword		**A**	**E+/-5**
1	Going to visit my newborn brother in hospital	SPEC/ 3	3	+3

2	Eating ice-cream that my aunt gave me without my mother knowing	SPEC 3	4	+5
3	Feeding lambs with my grandmother	GEN 3	5	+4
4	My grandmother making breakfast for me on Saturday mornings when everyone was still in bed	GEN 3	5	+5
5	Going to see our new house as it was being built	SPEC// 3	4	+2
6	Going to work with my dad	GEN 3	6	+4
7	Climbing over the fence to go and play with my neighbour	GEN 3	3	+1
8	Visiting another neighbour who used to make me tea in a glass mug	GEN 3	4	+3
9	Setting up my playhouse in my new bedroom	SPEC// 3	4	+2
10	A boy falling asleep in class and the teacher handing out the books quietly so she wouldn't wake him	SPEC/3	5	+1

Participant Dataset 3

	Memory Keyword		**A**	**E+/-5**
1	First trip to the zoo	SPEC/ 3	3	+1
2	Being carnival queen	SPEC/ 3	6	+2
3	Making dens with my friends	GEN 1	8	+4
4	3 week summer holiday	GEN 1	7	+4

5	Two dogs that we had	SPEC 1	4	-5
6	First trip on a boat	SPEC 3	5	+2
7	Best friend moved away	SPEC1	6	-4
8	We used to live on a farm	GEN 1	9	+5
9	losing my pet rabbit	SPEC 1	5	-5
10	Every Christmas was special	GEN 1	3-15	+5

Participant Dataset 4

	Memory Keyword		**A**	**E+/-5**
1	Performing in my first show as a ballerina	SPEC 3	3	+5
2	Teaching myself to read and write before attending school and sitting leaning on the desk practicing.	SPEC 1	3	+5
3	Reading and always asking for more books.	GEN 1	3	+5
4	Being a gymnast at a high level. It dominated all of my childhood.	SPEC 3	9	-2
5	Breaking my arm.	SPEC 1	7	-3
6	Dislocating my elbow as a gymnast.	SPEC1	7	-5
7	Performing as a gymnast in France and IOM	GEN 3	6	+2
8	Moving to Scotland and then returning	GEN 1	9	-5
9	Always wanting to look after my little brother.	SPEC 3	2	+5
10	Riding a bike without stabilizers at the age of three.	SPEC3	3	+5

Participant Dataset 5

	Memory Keyword		A	E+/-5
1	Snow blizzards-school closed	SPEC 3	8	5
2	Ballinclea house	GEN 1	7	3
3	Learning to cycle	SPEC 1	7	1
4	Brownies play	SPEC 3	8	0
5	Halloween party	GEN 1	9	4
6	The Swan Inn thunderstorm	SPEC 3	9	-3
7	Dad mends workbook	SPEC 3	5	3
8	New kitchen	SPEC 1	7	3
9	Ruth's first day	SPEC 3	3	-3
10	Uncle Bert's well	GEN 3	9	4

Participant Dataset 6

	Memory Keyword		A	E+/-5
1	Not being able to paint at first day of school	SPEC/1	5	-3
2	Trying to teach our cat how to swim	SPEC 1	8	-3
3	Being car sick	GEN 3	7	-3
4	Going to hospital to have stitches	SPEC 1	9	-3

5	My twin brother fainting at the sight of blood	SPEC 1	7	-1
6	Christmas with my mother hating her presents	GEN 3	8	-4
7	Knitting a coat hanger cover at school – badly!	SPEC 1	10	-1
8	The Christmas post deliveries at school	GEN 3	8	+2
9	Wanting to be in the boys football team	GEN 3	8	-1
10	Not wanting to wear a dress at my cousins wedding	SPEC 1	7	-2

Participant Dataset 7

	Memory Keyword		**A**	**E+/-5**
1	The first car of the family. blue. under the house.	SPEC/ 1	5	4
2	Listening to the radio at granny's house.	GEN 1	6	5
3	Playing in granny's garden.	SPEC 1	6	4
4	Playing video games at my aunt's living-room.	SPE1	6	4
5	Experiencing a 8,1 earthquake.	SPEC 1	9	0
6	Going camping around the country for holidays.	GEN 1	7	5
7	Reject my potential first boyfriend.	SPEC 1	9	3
8	Returning home from school trip.	SPEC 1	8	5
9	Playing playmobiles with brother.	GEN 1	5	5
10	Being ill, asking for mum.	SPEC 1	4	-2

Participant Dataset 8

	Memory Keyword		A	E+/-5
1	First day at school	SPEC 3	5	-3
2	Getting the ruler at school	SPEC 1	8	-5
3	My birthday cake	SPEC 1	10	5
4	Watching Mohammed Ali box	GEN 3	7	5
5	Learning sign language	GEN 3	8	4
6	Sam on our bikes	GEN 3	9	5
7	The caravan	GEN 3	9	5
8	Easter egg hunt	SPEC 3	6	5
9	Trouble for time keeping	SPEC 1	7	-4
10	Getting sweets from mum	SPEC 1	9	-1

Participant Dataset 9

	Memory Keyword		A	E+/-5
1	spider	SPEC 1	2	1
2	Mashing turnips	SPEC/ 1	2	1
3	Eating crushed eggs	GEN 3	2	2
4	Third birthday	SPEC 1	3	4

5	crucifix	GEN 1	3	-1
6	book	SPEC 1	3	3
7	cot	SPEC 1	3	-3
8	hens	/GEN 1	3	-1
9	Gran's visit	SPEC/ 1	3	5
10	Children's programme	GEN 3	3	3

Participant Dataset 10

	Memory Keyword		**A**	**E+/-5**
1	Crying in assembly	SPEC/ 3	4	-4
2	On train to Devon	SPEC/ /3	3	+3
3	Slippers for Christmas	/GEN 1	7	+4
4	Sister being born	/GEN /3	3	0
5	Brother being born	/GEN 1	6	+4
6	Going to Sri Lanka	GEN 1	9	+4
7	My dog dying	GEN 1	5	-4
8	Kicking my sister	SPEC/ /3	4	-2
9	Being ill	GEN 3	6	-4
10	Staying with my Nanny	GEN 3	6	+2

Appendix Four – Emotion anova

(Note: data was produced by averaging the likert responses)

```
SAVE OUTFILE='F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav'
/COMPRESSED.
SAVE OUTFILE='F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav'
/COMPRESSED.
SAVE OUTFILE='F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav'
/COMPRESSED.
SAVE OUTFILE='F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav'
/COMPRESSED.
SAVE OUTFILE='F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav'
/COMPRESSED.
GLM Spec1 Spec3 Gen1 Gen3
/WSFACTOR=Spec 2 Polynomial Gen 2 Polynomial
/METHOD=SSTYPE(3)
/CRITERIA=ALPHA(.05)
/WSDESIGN=Spec Gen Spec*Gen.
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General Linear Model

Notes			
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	N of Rows in Working Data File	10	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.	
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.	
Syntax		GLM Spec1 Spec3 Gen1 Gen3 /WSFACTOR=Spec 2 Polynomial Gen 2 Polynomi /METHOD=SSTYPE(3) /CRITERIA=ALPHA(.05) /WSDESIGN=Spec Gen Spec*Gen.	
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Within-Subjects Factors		

Measure:MEASURE_1		
Spec	Gen	Dependent Variable
1	1	Spec1
	2	Spec3
2	1	Gen1
	2	Gen3

Multivariate Tests[b]

Effect		Value	F	Hypothesis df	Error d
Spec	Pillai's Trace	.030	.282[a]	1.000	9.000	.608
	Wilks' Lambda	.970	.282[a]	1.000	9.000	.608
	Hotelling's Trace	.031	.282[a]	1.000	9.000	.608
	Roy's Largest Root	.031	.282[a]	1.000	9.000	.608
Gen	Pillai's Trace	.039	.367[a]	1.000	9.000	.559
	Wilks' Lambda	.961	.367[a]	1.000	9.000	.559
	Hotelling's Trace	.041	.367[a]	1.000	9.000	.559
	Roy's Largest Root	.041	.367[a]	1.000	9.000	.559
Spec * Gen	Pillai's Trace	.026	.238[a]	1.000	9.000	.637
	Wilks' Lambda	.974	.238[a]	1.000	9.000	.637
	Hotelling's Trace	.026	.238[a]	1.000	9.000	.637
	Roy's Largest Root	.026	.238[a]	1.000	9.000	.637

a. Exact statistic

b. Design: Intercept

Within Subjects Design: Spec + Gen + Spec * Gen

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect			Mauchly's W	Approx. Chi-Square	df	Sig.
dimension1	Spec	1.000	.000	0	.
	Gen	1.000	.000	0	.
	Spec * Gen	1.000	.000	0	.

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.
b. Design: Intercept Within Subjects Design: Spec + Gen + Spec * Gen

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1					
Within Subjects Effect			Epsilon[a]		
			Greenhouse-Geisser	Huynh-Feldt	Lower-bound
dimension1	Spec	1.000	1.000	1.000	
	Gen	1.000	1.000	1.000	
	Spec * Gen	1.000	1.000	1.000	

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.
a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.
b. Design: Intercept Within Subjects Design: Spec + Gen + Spec * Gen

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source			Type III Sum of Squares	df	Mea
Spec	Sphericity Assumed	.903	1	.903	
	Greenhouse-Geisser	.903	1.000	.903	
	Huynh-Feldt	.903	1.000	.903	
	Lower-bound	.903	1.000	.903	
Error(Spec)	Sphericity Assumed	28.782	9	3.198	
	Greenhouse-Geisser	28.782	9.000	3.198	
	Huynh-Feldt	28.782	9.000	3.198	
	Lower-bound	28.782	9.000	3.198	
Gen	Sphericity Assumed	1.985	1	1.985	
	Greenhouse-Geisser	1.985	1.000	1.985	
	Huynh-Feldt	1.985	1.000	1.985	

	Lower-bound	1.985	1.000	1.985
Error(Gen)	Sphericity Assumed	48.641	9	5.405
	Greenhouse-Geisser	48.641	9.000	5.405
	Huynh-Feldt	48.641	9.000	5.405
	Lower-bound	48.641	9.000	5.405
Spec * Gen	Sphericity Assumed	1.845	1	1.845
	Greenhouse-Geisser	1.845	1.000	1.845
	Huynh-Feldt	1.845	1.000	1.845
	Lower-bound	1.845	1.000	1.845
Error(Spec*Gen)	Sphericity Assumed	69.778	9	7.753
	Greenhouse-Geisser	69.778	9.000	7.753
	Huynh-Feldt	69.778	9.000	7.753
	Lower-bound	69.778	9.000	7.753

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source				F	Sig.
Spec	Sphericity Assumed	.282	.608		
	Greenhouse-Geisser	.282	.608		
	Huynh-Feldt	.282	.608		
	Lower-bound	.282	.608		
Gen	Sphericity Assumed	.367	.559		
	Greenhouse-Geisser	.367	.559		
	Huynh-Feldt	.367	.559		
	Lower-bound	.367	.559		
Spec * Gen	Sphericity Assumed	.238	.637		
	Greenhouse-Geisser	.238	.637		
	Huynh-Feldt	.238	.637		
	Lower-bound	.238	.637		

Tests of Within-Subjects Contrasts

Measure:MEASURE_1

Source				Gen	Type III Sum of Squares	df	Mean Square
Spec		Linear			.903	1	.903
Error(Spec)		Linear			28.782	9	3.198
Gen			dimension3	Linear	1.985	1	1.985
Error(Gen)			dimension3	Linear	48.641	9	5.405
Spec * Gen		Linear		Linear	1.845	1	1.845

Error(Spec*Gen)		Linear		Linear	69.778	9	7.753

Tests of Between-Subjects Effects					
Measure:MEASURE_1 Transformed Variable:Average					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	42.210	1	42.210	8.012	.020
Error	47.413	9	5.268		

```
GLM Spec1 Spec3 Gen1 Gen3
/WSFACTOR=Spec 2 Polynomial Gen 2 Polynomial
/METHOD=SSTYPE(3)
/PLOT=PROFILE(Spec*Gen)
/CRITERIA=ALPHA(.05)
/WSDESIGN=Spec Gen Spec*Gen.
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General Linear Model

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Comments			
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	Active Dataset	DataSet0	
	Filter	<none>	
	Weight	<none>	
	Split File	<none>	
	N of Rows in Working Data File	10	
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.	
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.	
Syntax		GLM Spec1 Spec3 Gen1 Gen3 /WSFACTOR=Spec 2 Polynomial Gen 2 Polynomi /METHOD=SSTYPE(3) /PLOT=PROFILE(Spec*Gen) /CRITERIA=ALPHA(.05) /WSDESIGN=Spec Gen Spec*Gen.	
Resources	Processor Time	00:00:01.125	
	Elapsed Time	00:00:08.077	

[DataSet0] F:\303\05\ExperimentResultsRENUMBERED\emotionanova.sav

Within-Subjects Factors				
Measure:MEASURE_1				
Spec	Gen	Dependent		

		Variable
1	1	Spec1
	2	Spec3
2	1	Gen1
	2	Gen3

Multivariate Tests[b]							
Effect				Value	F	Hypothesis df	Error d
Spec	Pillai's Trace	.030	.282[a]	1.000	9.000	.608	
	Wilks' Lambda	.970	.282[a]	1.000	9.000	.608	
	Hotelling's Trace	.031	.282[a]	1.000	9.000	.608	
	Roy's Largest Root	.031	.282[a]	1.000	9.000	.608	
Gen	Pillai's Trace	.039	.367[a]	1.000	9.000	.559	
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	Roy's Largest Root	.041	.367[a]	1.000	9.000	.559	
Spec * Gen	Pillai's Trace	.026	.238[a]	1.000	9.000	.637	
	Wilks' Lambda	.974	.238[a]	1.000	9.000	.637	
	Hotelling's Trace	.026	.238[a]	1.000	9.000	.637	
	Roy's Largest Root	.026	.238[a]	1.000	9.000	.637	
a. Exact statistic							
b. Design: Intercept Within Subjects Design: Spec + Gen + Spec * Gen							

Mauchly's Test of Sphericity[b]							
Measure:MEASURE_1							
Within Subjects Effect			Mauchly's W	Approx. Chi-Square		df	Sig.
dimension1	Spec	1.000	.000	0	.		
	Gen	1.000	.000	0	.		
	Spec * Gen	1.000	.000	0	.		
Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an							

identity matrix.
b. Design: Intercept Within Subjects Design: Spec + Gen + Spec * Gen

Mauchly's Test of Sphericity[b]

Measure:MEASURE_1

Within Subjects Effect			Epsilon[a]		
			Greenhouse-Geisser	Huynh-Feldt	Lower-bound
dimension1	Spec	1.000	1.000	1.000	
	Gen	1.000	1.000	1.000	
	Spec * Gen	1.000	1.000	1.000	

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept

Within Subjects Design: Spec + Gen + Spec * Gen

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source			Type III Sum of Squares	df	Mea
Spec	Sphericity Assumed	.903	1	.903	
	Greenhouse-Geisser	.903	1.000	.903	
	Huynh-Feldt	.903	1.000	.903	
	Lower-bound	.903	1.000	.903	
Error(Spec)	Sphericity Assumed	28.782	9	3.198	
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	Lower-bound	28.782	9.000	3.198	
Gen	Sphericity Assumed	1.985	1	1.985	
	Greenhouse-Geisser	1.985	1.000	1.985	
	Huynh-Feldt	1.985	1.000	1.985	
	Lower-bound	1.985	1.000	1.985	

Error(Gen)	Sphericity Assumed	48.641	9	5.405
	Greenhouse-Geisser	48.641	9.000	5.405
	Huynh-Feldt	48.641	9.000	5.405
	Lower-bound	48.641	9.000	5.405
Spec * Gen	Sphericity Assumed	1.845	1	1.845
	Greenhouse-Geisser	1.845	1.000	1.845
	Huynh-Feldt	1.845	1.000	1.845
	Lower-bound	1.845	1.000	1.845
Error(Spec*Gen)	Sphericity Assumed	69.778	9	7.753
	Greenhouse-Geisser	69.778	9.000	7.753
	Huynh-Feldt	69.778	9.000	7.753
	Lower-bound	69.778	9.000	7.753

Tests of Within-Subjects Effects

Measure:MEASURE_1

Source				F	Sig.
Spec	Sphericity Assumed	.282	.608		
	Greenhouse-Geisser	.282	.608		
	Huynh-Feldt	.282	.608		
	Lower-bound	.282	.608		
Gen	Sphericity Assumed	.367	.559		
	Greenhouse-Geisser	.367	.559		
	Huynh-Feldt	.367	.559		
	Lower-bound	.367	.559		
Spec * Gen	Sphericity Assumed	.238	.637		
	Greenhouse-Geisser	.238	.637		
	Huynh-Feldt	.238	.637		
	Lower-bound	.238	.637		

Tests of Within-Subjects Contrasts

Measure:MEASURE_1

Source				Gen	Type III Sum of Squares	df	Mean Square
Spec		Linear			.903	1	.903
Error(Spec)		Linear			28.782	9	3.198
Gen			dimension3	Linear	1.985	1	1.985
Error(Gen)			dimension3	Linear	48.641	9	5.405
Spec * Gen		Linear		Linear	1.845	1	1.845
Error(Spec*Ge		Linear		Linear	69.778	9	7.753

n)							

Tests of Between-Subjects Effects

Measure:MEASURE_1

Transformed Variable:Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	42.210	1	42.210	8.012	.020
Error	47.413	9	5.268		

Profile Plots

