CONJUGATE LATERAL EYE MOVEMENT AND SUBJECTIVE REPORTS OF ANXIETY SYMPTOMS

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ABSTRACT

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By

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Correlates of a conjugate lateral eye movement phenomenon are examined. The phenomenon occurs in a dyadic interaction when a person is asked a question requiring some reflection to answer. The initial movement of the eyes, either right or left, from the questioner is the movement referred to; it tends to be consistent for individuals. A list of 51 bodily reactions of anxiety to stressful situations was given to 148 undergraduate students to rate on a frequency of occurrence scale. The frequence of occurrence of each of these symptoms was correlated with the variables sex and direction of eye movement.

Previous authors have linked this eye movement phenomenon to anxiety reactions, reporting that moving the eyes to the left is associated with increased heart rate and breathing rate, flaccid large postural muscles, a tendency to be alcoholic, and general

sympathetic nervous system reactivity. Moving the eyes to the right is associated with a slowing and strengthening of both heart rate and breathing rate, an increase in underarm perspiration, high tonus in the large postural muscles, more muscle tics and twitches, more speech disturbance than left eye movers, and general parasympathetic nervous system reactivity.

The general finding is that the variables of sex and eye movement are relatively weak predictors over the set of anxiety symptoms; however, most all of the previously reported findings were, if not significant, at least in the predicted direction. The main finding not supported was the attribution of sympathetic reactivity to left eye movers and of parasympathetic reactivity to right eye movers. A more striking finding was the report of symptoms concerned with interior body functioning by left eye movers, especially for males; and the report of symptoms concerned with the body's surface layers by right movers, especially for males. This pattern did not hold for females considered separately. The primary sex difference found was that females report more symptoms more often than do males.

Cluster and factor analyses of the anxiety symptoms are presented. The symptoms cluster around particular areas and functions of the body, suggesting an inner vs. outer or body layer

scheme for investigating anxiety symptoms instead of a sympathetic-parasympathetic dichotomy.

A discussion of the problems with the data and suggestions for further research are offered.

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INTRODUCTION

The Conjugate Lateral Eye Movement Phenomenon

The phenomenon of conjugate lateral eye movement, CLEM, has been investigated by Day [1] and later and independently by Libby [2]. When a person is asked a question that requires some reflection while he is in eye contact with the questioner, he tends to move his eyes to either the right or the left; up and down movements may also occur at the same time. Day noted that movement to the right or left is consistent for a given individual. Day [3] later reported that the direction of CLEM was not related to handedness or to eye dominance. Duke [4] showed that CLEM was a relatively reliable phenomenon; that there was a strong association with reflective thought processes; and that there was a lack of association with sex, handedness, and with eye dominance factors. Libby [2] has also shown these relations.

Correlates to CLEM

Day [1] observed that persons with left directed CLEM, left movers or LMS, tended to have a passive internalized mode of

attention and to emphasize subjective internal experience and sensations; persons with right directed CLEM, right movers or RMS, tended to have a passive externalized mode of attention and to emphasize externally perceived causes for anxiety and tension. In a later paper Day [5] showed that LMS and RMS show systematic differences in EEG and EOG reactivity, e.g., EEG records of LMS showed a greater amplitude and lower frequency than those of RMS. Day states that these differences appear to relate to individual differences in higher verbal processes, reaction to anxiety, and to characteristic functional differences in attentional processes.

Day's description of LMS as tending to focus more on internal, subjective experiences, and Hilgard's nearly parallel description of the good hypnotic S, led Bakan [6] to show that indeed LMS had the highest scores on the Stanford Hypnotic Susceptibility Scale (Form C) and RMS had the lowest scores.

Day [5] found that the EEG records of LMS show greater amplitude and lower frequency than those of RMS. Bakan [7] cites a number of results showing that high alpha-wave (8-13 cycle-per-second) production on EEGs was correlated with high susceptibility to hypnosis. Combining these findings, Bakan and Svorad [8] went on to show that LMS produce alpha-waves 52% of the time and RMS only 20% of the time. A replication of this study by Strayer [9]

showed that left CLEM was more frequent in persons with high basal alpha-wave levels. However, this relation was true for males but not for females. Also LMS were able to increase their alpha-wave production and RMS were not. Bakan hypothesizes that since relaxation facilitates alpha-wave production, the LMS were more able to relax. Day observed that RMS have greater tonus in their large postural muscles indicating less ability to relax and thus supporting the relaxation hypothesis.

Some additional differences between RMS and LMS noted by Bakan [10] are that RMS have more muscular tics and twitches than LMS and male LMS are more likely to be alcoholic.

A Conceptual Model

Since the direction of CLEM is correlated with these kinds of variables, the question arises as to how this data might be brought into a conceptual model of nervous system functioning. According to Bakan [7],

> One of the most frequent motor responses to electrical stimulation of the cerebral cortex is eye-movement. When parts of the left cerebral hemisphere are stimulated, the eyes will move to the right. When the [same] parts of the right hemisphere are stimulated, the eyes shift to the left.

Bakan's thesis is that CLEM is related to the two asymmetrical hemispheres of the brain and that the personalities of persons who

look either right, RMS, or who look left, LMS, are more likely to reflect the style of left or right hemisphere functioning respectively. Bakan proposes, in this regard, a double cerebral dominance model for brain functioning, i.e., that dominance shifts between the two hemispheres of the brain depending upon the particular behavior or function involved. To quote Bakan [7]:

> Scientists have long believed that the left hemisphere is dominant for speech, writing, and other symbolic functions. There is also evidence that the left hemisphere dominates in such functions as arithmetic, analytical activity, logical and abstract thinking, time discrimination and euphoria.
>
> There is rapidly accumulating evidence that the right hemisphere is dominant for such nonverbal functions as spatial perception, body-image functions, imagery, recognition of melodies, recognition of faces and for such perceptual-motor constructional functions as drawing and block design. There are also data that support association of the right hemisphere with creativity, depression and certain language functions.

Bakan also notes recent evidence that the left hemisphere functions at a higher rate of arousal than the right hemisphere. This may explain the finding of greater amounts of EEG alpha wave production associated with a low arousal or more relaxed state occurring in the right hemisphere. Bakan suggests that other states of consciousness associated with relaxation or low arousal, e.g., hypnosis, meditation, daydreaming, psychedelic intoxication and anesthesia, may be associated to a greater extent with right hemisphere functioning; he notes in addition that these states are

characterized by the absence of the left hemisphere function of logical speech.

Sperry [11] has studied a number of persons who have had their right and left hemispheres surgically separated. Thus able to test very directly the differential functioning of the two hemispheres in adults, he characterized the two hemispheres as follows: the left hemisphere tends to be verbal, rational, digital and objective while the right hemisphere tends to be nonverbal, emotional, analogical and subjective. Again Bakan proposes that RMS will be better described by the left hemisphere functions and LMS by the right hemisphere functions. Of course in studies of persons with the two hemispheres intact and connected, the communication between the two hemispheres allows for a wide range of possibilities of integration of many functions. Thus differences based upon the criterion of direction of CLEM may not be expected to be in many instances clearly significant.

Sex Differences

In several studies of CLEM it has been shown that females are less likely to move their eyes consistently either left or right and are thus less frequently consistent LMS or RMS. Day [3] notes a tendency for males to be RMS and for females to be LMS.

Differences in the EEG alpha-wave production in right and left hemispheres are not as clear for females as for males. Brain surgery data indicate that female functioning is less impaired than male functioning after removal of comparable parts of the left or right hemisphere. This data and additional data showing differences occurring in cortical evoked potentials all seem to indicate that there is more hemispheric integration in females and that there are differences in asymmetrical organization of the brain for males and females. Bakan [7] suggests that many observed cognitive and affective differences between the sexes may be related to these differences in lateral central nervous system organization.

Differences in Reaction to Anxiety

Day has written that RMS and LMS differ in their reactions to anxiety and/or to stress producing situations. In his earlier paper Day [1] observed that right CLEM was "perfectly" related to S report of anxiety as a panic feeling with an externalized perception of cause. Thus for persons with what he describes as a passive externalized mode of attention, the qualitative experience of anxiety is fear and cholinergic autonomic (parasympathetic) sensations are reported somatically. Similarly left CLEM was "perfectly" related to S report of anxiety as tension, as in internally perceived impulse

feeling. Thus for persons with a passive, auditory internalized mode of attention, adrenergic autonomic (sympathetic) sensations are reported somatically. Day offers a hypothesis to explain how the two personality types are created. If early experience of the person is mainly externalized, as might be associated with a greater use of verbs, then any passive internalized attention would result in a panicky feeling of anxiety, as for right eye-movers, RMS. If early experience is internalized, as might be associated with greater use of adjectives, then any active externalized attention would result in feelings of tension, as for left eye-movers, LMS.

In a later study Day [3] made a number of observations related to CLEMs and to S reactions to stress. Some of Day's specific observations that apply most directly to the present study are as follows. LMS tend to emphasize hyperactivity of the upper viscera with increase in heart rate and in breathing rate; they experience an inability to maintain visual attention because of (inferred) obsessive intrusions; and the large postural muscles are often flaccid even though the S complains of generalized muscle tension. RMS tend to emphasize lower visceral hyperactivity with slowing and strengthening of heart rate and breathing rate; they have an increase in axillary armpit perspiration; and their large muscle tonus is high.

Objectives of this Study

To rephrase Day's observations in terms of hypotheses, we would expect that, under stressful conditions, LMS will have increased heart rate and breathing rate; they should find it difficult to maintain visual attention and will be preoccupied with their thoughts and sensations; and they should have flaccid large postural muscles. RMS should have a slowing and strengthening of both heart rate and breathing rate; they should have an increase in underarm perspiration; and they should have high tonus in their large postural muscles. In addition to these hypotheses a number of other emotional reactions to anxiety and stress will be investigated; see Appendix B for a complete list of symptoms. One hypothesis to be tested is that speech disturbance, primarily a left hemisphere function, will be reported more often by RMS.

Day's data regarding differences between LMS' and RMS' reactions to anxiety come from his clinical observations. The objective of this study is to provide empirical data based on subjective reports of emotional reactions to anxiety provoking situations. This method was chosen as an initial investigatory procedure primarily because of the relative ease in gathering the data.

The data will be analyzed for general response set tendencies, LM-RM differences and sex differences. A broad range of

reactions was included so that various cluster and factor analyses could be made. When the variables are collapsed into group factors, an additional analysis of LM-RM differences and sex differences will be made.

Following discussion of the results, a section on problems with the data will be offered along with suggestions for further research.

PROCEDURE

Determination of CLEM

The Ss were 148 male and female undergraduate psychology students at Michigan State University. They were selected from a larger number of students who were presented individually with ten proverbs to interpret. See Appendix A for a list of the ten proverbs used. The Ss were tested in a plain room facing a wall without distracting pictures or windows. The S faced the male E straight on while the E gave the instructions. The instructions were not formalized but essentially the S was told that this was an experiment to investigate individual differences in thought processes as the S responded by interpreting a list of ten proverbs. Before stating each proverb the E would make sure that the S was facing him directly and had direct eye contact as the proverb was given. The Ss first directional eye movement response was recorded for each of the ten proverbs. Those whose eyes moved to the right 70 to 100 percent of the time were called right eye-movers, RMS; and those whose eyes moved to the left 70 to 100 percent of the time were called left eye-movers, LMS. This criterion has been used by Bakan in

his studies of CLEM. All Ss were right handed. The 148 Ss are divided into four groups by sex and eye movement; there are 37 male RMS, 33 female RMS, 41 male LMS and 37 female LMS.

Subjective Report of Reactions to Anxiety

The 148 Ss were later given a "Body Feeling Inventory" questionnaire in a group setting; see Appendix B for a copy of this questionnaire. The list of 51 items was compiled by Paul Bakan. The questionnaire asked for the frequency of bodily reactions experienced by the S during stressful or anxiety provoking situations, e.g., waiting in a doctor's office, taking an important exam, before talking in front of a group, etc. The 51 reactions or symptoms were listed to be rated on a five-point frequency of occurrence scale: 1--always, 2--often, 3--sometimes, 4--rarely, and 5--never. The determination of CLEM was done independently of acquiring and analyzing the questionnaire results.

RESULTS

General Response Tendencies

Table 1a shows the distribution of average response scores over all 51 variables for all 148 Ss. The entries in Table 1a are the number of Ss with average response scores between the points on the frequency scale, e.g., two male LMS had scores in the interval 2.5 to 3.0 and 15 male LMS had scores in the interval between 3.0 and the average response score over all Ss of 3.52. The column to the extreme right gives the average response score for each group listed in the first column. See Appendix C for the average score by the four main groups for each of the 51 variables.

In Table 1b are shown the number of Ss in each group both below and above the overall average of 3.52. The results of Chi-square computations are given; only the grouping of all males vs. all females shows a significant result. The correlation between sex and anxiety is .14 so females report more symptoms or reactions to stress than do males.

TABLE 1a. -- Distribution of average response scores over all 51 variables for all 148 Ss and group average scores

Group	Scale							No. of Ss	Group Avg.
	Often 2.0	2.5	Some-times 3.0	Over-all Avg. 3.52	Rarely 4.0	4.5	Never 5.0		
M-LM	0	2	15	20	3	1		41	3.564
M-RM	1	2	11	13	10	0		37	3.594
F-LM	1	3	17	10	5	1		37	3.462
F-RM	0	4	13	15	1	0		33	3.449
Total	2	11	56	58	19	2		148	3.520
Males	1	4	26	33	13	1			3.578
Females	1	7	30	25	6	1			3.456
LMS	1	5	32	30	8	2			3.516
RMS	1	6	24	28	11	0			3.526

TABLE 1b. -- Number of Ss by group below and above the overall average and Chi-square tests for significance

Group	Overall Average = 3.52		Chi-square	d.f.	p
	Below	Above			
M-LM	17	24	.105	1	n.s.
M-RM	14	23			
F-LM	21	16	.187	1	n.s.
F-RM	17	16			
Males	31	47	3.17	1	.10
Females	38	32			
LMS	38	40	.279	1	n.s.
RMS	31	39			

Results of Analysis Over All 51 Variables

All point-biserial correlations reported were obtained using the computer program PACKAGE [12]. For all 148 Ss, Appendix D is a table of correlations between each of the 51 anxiety variables, the 8 group factors from the factor analysis solution, and the 3 variables sex, eye movement and the product interaction between sex and eye movement. The correlations used in Tables 3a, 3b, 8a and 8b for males and females considered separately are not included in the Appendices.

The absolute value of the correlations over all 148 Ss to be significant at the .05 level must be .17 or greater; at the .10 level, .14 or greater; at the .20 level, .11 or greater. Only a few correlations are .30 or above; most reported are .20 or below.

In Tables 3a and 8a for the 78 male Ss considered separately, the absolute value of the correlations necessary for given significance levels are as follows: at the .05 level, $r \geq .23$; at the .10 level, $r \geq .19$; and at the .20 level, $r \geq .15$. Similarly, in Tables 3b and 8b for the 70 female Ss considered separately, the correlations necessary are: at the .05 level, $r \geq .24$; at the .10 level, $r \geq .20$; and at the .20 level, $r \geq .16$. Again the correlations reported are on the order of .15 to .20. The tentative conclusion here is that the variables of sex and eye movement are relatively weak predictors of performance on this set of anxiety items.

LM-RM Differences

Table 2 is a list of eye movement effects over all 148 Ss in order of significance up to $p < .20$. All of the items significant for $p < .10$ are RM items. Muscle tics or twitches (27) and inability to speak coherently (37) have been shown to be RM items previously by Bakan; item 27 is seemingly related to the increased muscle tension of RMS as reported by Day, and item 37 appears to support the hypothesis that any emotional disturbance that affected speech and hence the left hemisphere would affect RMS more. Cold hands (3) and feet cold (44) seem related to peripheral vasoconstriction, an adrenergic (sympathetic) reaction. This result appears

TABLE 2. -- Eye movement effects in order of significance up to $p < .20$ for all 148 Ss; point-biserial correlations are given

r	Item No.	p <	LM Items	RM Items
.19	27	.05		Muscle tics or twitches
.17	3	.05		Cold hands
.15	44	.10		Feet cold
.14	37	.10		Inability to speak coherently
.14	4	.10		Under arm perspiration
-.12	48	.20	Smell fingers, scratch scalp or other activities bringing hand to face	
-.12	7	.20	Dryness in mouth	

opposite to Day's [1] report of RMS reporting cholinergic reactions. Underarm perspiration (4) confirms Day's [3] specific hypothesis regarding this as a RM symptom. The less significant LM item, smell fingers, . . . hand to face (48), is less clear as to its possible meanings; possibly such activity could be hypothesized to relate to the visual inattention and preoccupation with thoughts and sensations attributed to LMS by Day. Also, dryness in mouth (7) is a possible adrenergic (sympathetic) reaction attributed to LMS by Day.

Table 3 is a list of eye movement effects for males and for females considered separately in order of significance up to $p < .20$. Table 3a for the 78 male Ss reveals an interesting pattern of items: all of the LM items refer to some function of the alimentary canal, from oral behavior to gastrointestinal activity. The items upset stomach (19), need to urinate (38) and need to defecate (39) are all directly cholinergic (parasympathetic) stimulation. This result appears counter to Day's attribution of adrenergic reactions to LMS. Diarrhea (20) may be grouped with items 19, 38, and 39 above, although it could also have some connotations of sickness for LMS. The LM item dryness in mouth (7) is again a possible adrenergic (sympathetic) reaction and hence does not fit in this dimension with the other items. Take a drink (alcohol) (50) is possibly related to Bakan's finding that LMS are more likely to be alcoholic.

The RM items, in contrast, all deal either with the body surface or with a motor function. Items 27, 4, 3 and 37 have already been discussed as RM items from Table 2. Breathing deeper (14) is a cholinergic (parasympathetic) reaction and is specifically noted by Day as a RM item. Many bodily reactions (1) seems too vague an item to be interpreted along any dimension mentioned.

Table 3b for the 70 female Ss does not show the same interior vs. exterior dimension so evident for males. The LM item difficulty in talking (22) runs counter to the expectation of the hypothesis that left-hemisphere disturbance impairs RMS speech more. Perhaps this is an indication that females have greater integration of speech function than do males. Item 48 has already been discussed from Table 2 as a LM item. Items 3 and 44 have already been discussed as RM items from Table 2. Use a tranquilizer (51) appears to be a RM item for females since 8 of 33 female RMS report some use and only 4 of 37 female LMS report some use. Aware of change in breathing (13) is unclear as to the direction of the change and hence not readily interpretable.

Sex Differences

Table 4 is a list of sex effects over all 51 variables for all 148 Ss in order of significance up to $p < .20$. The primary effect

TABLE 3a. -- Eye movement effects in order of significance up to $p < .20$ for the 78 male Ss; point-biserial correlations are given

r	Item No.	p <	LM Items (Male)	RM Items (Male)
.25	27	.05		Muscle tics or twitches
-.25	20	.05	Diarrhea	
.21	4	.10		Underarm perspiration
-.20	7	.10	Dryness in mouth	
-.18	19	.20	Upset stomach	
.18	3	.20		Hands cold
-.18	50	.20	Take a drink (alcohol)	
.17	37	.20		Inability to speak coherently
.16	14	.20		Breathing deeper
.16	1	.20		Many bodily reactions
-.15	38	.20	Need to urinate	
-.15	39	.20	Need to defecate	

TABLE 3b. -- Eye movement effects in order of significance up to $p < .20$ for the 70 female Ss; point-biserial correlations are given

r	Item No.	p <	LM Items (Female)	RM Items (Female)
-.21	22	.10	Difficulty in talking	
.20	51	.10		Use a tranquilizer
-.19	48	.20	Smell fingers, etc., bringing hand to face	
.18	3	.20		Hands cold
.18	44	.20		Cold feet
.16	13	.20		Aware of change in breathing

evident here is the large number of items significant for females as opposed to the small number for males. This appears to support the idea from Table 1 that there may be a sex-linked response set in operation with this data. It is perhaps more socially acceptable for females to report more symptoms more often and for males to report themselves as staying "cool." Additional support for this hypothesis comes from the fact that relaxation (34) is the only item reported significantly more often for males with $p < .10$.

Results of Cluster and Factor Analyses

One cluster analysis and one factor analysis solution are included here, followed by analysis of sex and LM-RM differences over the groups provided primarily by the factor analysis solution.

An Oblique Multiple Groups Solution

The computer program PACKAGE by Hunter and Cohen [12] was used to cluster analyze the data for all 148 Ss. Basically the program computes a correlation matrix and offers several options, e.g., blind ordering procedures, computations of communalities, multiple grouping of variables, etc., enabling one to cluster analyze the data. Initial runs showed a large subset of the variables forming a positive manifold of high correlation coefficients indicative of a strong general factor in the data. The centroid of this manifold was

TABLE 4. -- Sex effects over all 51 variables for all 148 Ss, in order of significance up to $p < .20$; point-biserial correlations are given

r	Item No.	p <	Male Items	Female Items
.33	3	.05		Hands cold
.32	19	.05		Upset stomach
.27	2	.05		Face hot or flushed
.26	10	.05		Headache
.23	29	.05		Shivering
.23	45	.05		General restlessness
.20	44	.05		Cold feet
.20	46	.05		Nervous stomach
.19	33	.05		Fainting
.19	21	.05		Sinking feeling in stomach
.17	35	.05		Dizziness
.15	30	.10		Nausea
.15	36	.10		Hand shaking or tremor
.15	28	.10		Face gets pale
.15	24	.10		Pick on skin around fingernails
-.14	34	.10	Relaxation	
.14	37	.10		Inability to speak coherently
.13	20	.20		Diarrhea
.12	42	.20		Neck and shoulders tight or rigid
.11	18	.20		Choked up feeling
-.11	47	.20	Pick on skin or pimples	
.11	41	.20		Move around more
-.11	5	.20	Much sweating	

partialed out of the matrix to make the factor structure clearer. This method is equivalent to removing the effect of the general factor, which might be called "general anxiety." Table 5 shows the oblique multiple groups solution resulting after this step.

There are eleven group factors that group very closely items of similar content; this shows a high degree of reliability in the data due to item content. The content of most of the eleven groups is self-evident except for group 8, which combines oral and eliminatory symptoms with the general malaise connotation of such items as vomiting (31), dizziness (35), headache (10) and tired (43).

A Varimax Rotation to Five Factors Solution

The data were further analyzed with a computer routine which computes a principal components solution and then rotates using both Quartimax and Varimax methods with several options of criteria for stopping the factoring. These computer runs were made with the original 51 variables plus one for sex and one for eye movement. Several of these combinations of options produced sets of factors in many ways similar to the oblique multiple groups solution in Table 5.

In particular one standard and widely accepted combination of factor analysis is the Varimax rotation of the principal components

TABLE 5. -- Final oblique multiple groups solution after positive manifold has been partialed out

Group No.	Item No.	Item Name
1	21	Sinking feeling in stomach
	46	Nervous stomach
	19	Upset stomach
	30	Nausea
2	13	Aware of change in breathing
	16	Breathing more rapid
	15	Breathing shallower
3	22	Difficulty in talking
	37	Inability to speak coherently
4	12	Heart beats faster
	11	Aware of heartbeat
	2	Face hot or flushed
	17	Blood rushes to head
5	47	Pick on skin or pimples
	48	Smell fingers, scratch scalp or other activities bringing hand to face
	24	Pick on skin around fingernails
	23	Bite fingernails
6	25	Tension in jaw
	26	Bite down on teeth
7	42	Neck and shoulders feel tight or rigid
	9	Muscle tension

TABLE 5. --Continued

Group No.	Item No.	Item Name
8	50	Take a drink (alcohol)
	39	Need to defecate
	38	Need to urinate
	31	Vomiting
	33	Fainting
	49	Smoke cigarette
	51	Use a tranquilizer
	35	Dizziness
	10	Headache
	43	Tired
9	5	Much sweating
	4	Under arm perspiration
	6	Sweat on palms
10	8	Lump in throat
	7	Dryness in mouth
11	3	Hands cold
	44	Cold feet

solution with a Kiel-Wrigley criterion for stopping the factoring. This results in the set of factors I through V shown in Table 6. This set is particularly interesting as it effectively groups the variables by content into separate areas and functions of the body. Factors VI through VIII are specific factors from the oblique multiple groups solution and are listed because of their independence of content to the first five factors.

The eight groups in Table 6 were used to test for LM-RM differences and for sex differences using the original data. The first five groups were used since they more nearly represent an orthogonal factor solution than the previous oblique solution. The results of the analysis over these groups should give approximately the same pattern of results as the analysis over the 51 variables.

A list of the eight factors in the factor analysis solution is given in Appendix E along with a table of intercorrelations of each of these eight factors with the other factors and with the three variables sex, eye movement and the product interaction of sex and eye movement. Included at the bottom are the standard score coefficient alphas or the reliabilities of the eight factor groups. This Appendix has been included for the interest of the more quantitatively oriented reader.

TABLE 6. -- Factor analysis, Varimax rotation to five factors, Kiel-Wrigley criterion, factors VI-VIII from previous multiple groups solution; factor loadings are given

Factor No.	Factor Loadings	Item No.	Item Name	Factor Name
I	.74	46	Nervous stomach	Visceral (stomach) reactivity
	.64	21	Sinking feeling in stomach	
	.64	19	Upset stomach	
	.58	30	Nausea	
	.56	34	Relaxation (reflected)	
II	-.70	50	Take a drink (alcohol)	Lower visceral and oral reactivity (alimentary canal) and malaise
	-.67	39	Need to defecate	
	-.46	38	Need to urinate	
	-.55	20	Diarrhea	
	-.63	31	Vomiting	
	-.50	35	Dizziness	
	-.40	33	Fainting	
	-.38	51	Use a tranquilizer	
	-.49	49	Smoke cigarette	
III	.70	11	Aware of heartbeat	Upper visceral (heart) and respiratory reactivity
	.70	12	Heartbeat faster	
	.68	16	Breathing more rapid	
	.67	13	Aware of change in breathing	
	.64	15	Breathing shallower	
	.51	14	Breathing deeper	
IV	-.62	40	Inability to concentrate	Muscle tension
	-.63	26	Bite down on teeth	
	-.58	25	Tension in jaw	
	-.52	41	Move around more	
	-.46	42	Neck and shoulders feel tight or rigid	
	-.35	9	Muscle tension	

TABLE 6. --Continued

Factor No.	Factor Loadings	Item No.	Item Name	Factor Name
V	.52	23	Bite fingernails	Motor/hand to face
	.50	47	Pick on skin or pimples	
	.50	24	Pick on skin around fingernails	
	.42	48	Smell fingers, scratch scalp or other activities bringing hand to face	
VI		5	Much sweating	Sweat
		4	Under arm perspiration	
		6	Sweat on palms	
VII		22	Difficulty in talking	Speech disruption
		37	Inability to speak coherently	
VIII		3	Cold hands	Sympathetic (adrenergic) reaction
		44	Cold feet	

LM-RM Differences

Table 7 is a list of eye movement effects in order of significance up to $p < .50$ over the eight factors listed in Table 6 over all 148 Ss.

TABLE 7. -- Eye movement effects in order of significance up to $p < .50$ for all 148 Ss; point-biserial correlations are given

r	Factor No.	p <	LM Items	RM Items
.23	VIII	.05		Sympathetic (adrenergic) reaction
-.13	V	.20	Motor/hand to face	
.09	III	.50		Upper visceral (heart) and respiratory reactivity

Factors VIII and V, sympathetic reaction for RMS and motor/hand to face for LMS, are the same as conclusions made following Table 2. The additional RM factor III is less significant and confusing since it contains both adrenergic (sympathetic) and cholinergic (parasympathetic) symptoms. From the original data each of the six items in this factor were reported more often by RMS of both sexes. This tends to show the weakness of the sympathetic-parasympathetic dichotomy for this factor over all Ss.

Table 8a is a list of eye movement effects in order of significance up to $p < .50$ for the 78 male Ss considered separately over the eight group factors. These effects have all been described before in part; the lower visceral and oral factor (II) as a LM factor and the sympathetic reaction factor (VIII) and speech disruption factor (VII) as RM factors from Table 3a; and the motor/hand to face factor (V) as a LM factor from Table 2.

Table 8b is a list of eye movement effects in order of significance up to $p < .50$ for the 70 female Ss considered separately over the eight group factors. The effects of the sympathetic reaction factor (VIII) and the motor/hand to face factor (V) as RM and LM factors respectively have been discussed following Table 3b. There was also some indication from Table 3b that aware of change in breathing (13) was a female RM item; the result in Table 8b has the entire factor upper visceral (heart) and respiratory reactivity (III) as a female RM factor. From the original data all items in this factor are reported more often by RMS of both sexes. Females report items 11, 12 and 16 more often; these items all relate to an increase in heart and breathing rates. This does not support Day's attribution of such reactivity to LMS.

TABLE 8a. --Eye movement effects in order of significance up to $p < .50$ for the 78 male Ss; point-biserial correlations are given

r	Factor No.	p <	LM Items (Male)	RM Items (Male)
.17	VIII	.20		Sympathetic (adrenergic) reaction
-.13	II	.50	Lower visceral and oral reactivity (alimentary canal) and malaise	
.11	VII	.50		Speech disruption
-.09	V	.50	Motor/hand to face	

TABLE 8b. --Eye movement effects in order of significance up to $p < .50$ for the 70 female Ss; point-biserial correlations are given

r	Factor No.	p <	LM Items (Female)	RM Items (Female)
.23	VIII	.10		Sympathetic (adrenergic) reaction
.13	III	.50		Upper visceral (heart) and respiratory reactivity
-.13	V	.50	Motor/hand to face	

Sex Differences

Table 9 is a list of sex effects in order of significance up to $p < .50$ for all 148 Ss over the eight group factors. That females tend to report more symptoms more often than males is in evidence here. Only on the sweat (VI) factor at $p < .50$ do males report more often. And again it is likely that sweating is less socially desirable and admittable for females than for males. Hunter [16] has suggested that males may have more sweat glands, especially under the arms where it is noticed more.

TABLE 9. --Sex effects in order of significance up to $p < .50$ for all 148 Ss; point-biserial correlations are given

r	Factor No.	p <	Male Items	Female Items
.38	VIII	.05		Sympathetic (adrenergic) reaction
.30	I	.05		Visceral (stomach) reactivity
.13	VII	.20		Speech disruption
.13	IV	.20		Muscle tension
.11	II	.50		Lower visceral and oral reactivity (alimentary canal) and malaise
-.06	VI	.50	Sweat	

DISCUSSION

General Response Tendencies

The significant Chi-square in Table 1b shows that women report symptoms of anxiety more often than men. One possible explanation is that women may be more anxious than men. On the other hand, women may simply be more honest in their reporting (or in their memory) of reactions that reflect "fear under stress."

The results in Tables 4 and 9 that males admit only to relaxation (34), pick on skin or pimples (47), much sweating (5) and, at $p < .50$, to sweating (VI) more often than females add support to a socially acceptable response set hypothesis: women are supposed to be emotional creatures and can report emotional reactions but men are supposed to be unemotional and cannot admit them. Thus prevailing social mores may act to decrease male awareness but certainly the reporting of emotional reactions.

Discussion of Analysis Over All 51 Variables

Throughout the discussion, it should be noted that the correlations quoted are on the order of .15, .20 and less often .30. The discussion is to be weighed by the reader in this light. Although the variables of sex and eye movement are relatively weak predictors of performance over this set of anxiety items, the resulting patterns are significantly interesting to add support to the general theses on which this work is based.

LM-RM Differences for Males and Females Combined

The results for RMS support previous hypotheses and observations by Day and Bakan except for the cold hands and feet cold items. These latter items contradict Day's easy dichotomy of LM-sympathetic (adrenergic) symptoms and RM-parasympathetic (cholinergic) symptoms. What does emerge is a picture of RMS having more muscle tics and twitches perhaps related to greater muscle tension, increased underarm perspiration, cold hands and cold feet. Coherent speech is disrupted also, presumably because of some disturbance in the left hemisphere. These symptoms all relate to the body surface: to the skin, the muscle sheath, selected sweat glands and to the motor function of speech.

Of the two LM items, dryness in mouth (7) supports Day's ascription of sympathetic (adrenergic) autonomic reactions to LMS. However, the implications of smell fingers, . . . hand to face (48) are not clear. It is a motor function, it affects the skin surface and may be linked to Day's observation that LMS are unable to maintain external visual attention because they tend to be obsessional about emerging impulses and become preoccupied with thoughts and sensations.

LM-RM Differences for Males Considered Separately

The RM items for males are nearly the same as for RMS over all Ss; they all are reactions at the body surface or are motor functions. Even the additional breathing deeper (14) item is closely associated with the body's muscle sheath.

The LM items for males in striking contrast all relate directly to the functioning of the alimentary canal, represent primarily parasympathetic (cholinergic) reactivity and refer to functions interior to the body. This result does not support Day's observation that LMS report adrenergic (sympathetic) sensations. The LM items in contrast to the RM items strongly suggest an inner vs. outer awareness dimension for LM and RM males respectively.

Fisher and Cleveland [13] have found that males with definite body image boundaries experience greater physiological reactivity at the body surface and lesser internal (heart response) activity. Males with Rorschach scores indicating indefinite body image boundaries showed an opposite pattern. Thus these results suggest that male LMS might be found to have less definite body image boundaries than male RMS. Fisher [13] replicated this study using female adolescent Ss and found the results to be in exactly the same directions. These resulting patterns of reactivity for males and females in both studies were very significant under conditions of high emotional arousal and only borderline during periods of rest.

Fisher [14] discusses the need for alternatives to describing physiological reactivity in terms of a sympathetic-parasympathetic dimension. His preference is for an inner vs. outer dimension based upon ratings from Rorschach protocols of "barrier" vs. "penetration of boundary" scores. Persons who visualize their boundaries as thick and armored manifest a higher level of aspiration, more drive toward self-expression and more motivation for competitive advancement than do persons with indefinite body-image boundaries. Thus from the results in Table 3a male RMS should show these high drive characteristics and male LMS would not.

LM-RM Differences for Females Considered Separately

The same inner vs. outer reaction dichotomy is not evident in the results for females in Table 3b, or at least not along the CLEM dimension. The cold hands and feet, and the aware of change in breathing items are all associated with the outer body layers, the skin and muscle sheath. The smell fingers, . . . hand to face item has been previously discussed as a LM item. Use of a tranquilizer was reported by 8 of 33 female RMS and by 4 of 37 female LMS. Bakan's suggestion [7] that RMS are more tense might be linked to a greater use of tranquilizers by RM females.

Difficulty in talking (22) is a LM item for females only. The parallel content item inability to speak coherently (37) is a RM item for males and for all Ss considered together. From the fact that the left hemisphere is generally dominant for verbal activity, it seems to follow that RMS would be affected more by any disturbance in that hemisphere. That females and especially LM females report disturbance in speech may be evidence of greater integration of and/or less definitely located speech centers in females.

Sex Differences

If there are any differences in emotional reactivity to anxiety or stress between males and females other than those

previously discussed in the subsection General Response Tendencies, they have been obscured in this data.

Discussion of Cluster and Factor Analyses

The Oblique Multiple Groups Solution

The cluster analysis in Table 5 contains 38 of the 51 variables in the study and shows that the data has a high degree of reliability with respect to the content of the items. The eleven groups represent the following bodily reactions: group 1--all uncomfortable stomach sensations; group 2--all involve an increase in respiratory activity; group 3--both involve a disturbance of speech; group 4--all involve an increase in heart rate and blood rising to the face and head; group 5--all involve bringing the hand to the face or mouth; group 6--both are tension in the jaw; group 7--both are muscle tension items; group 8--are items that involve both oral and eliminatory system symptoms plus items with a general connotation of malaise, i.e., vomiting (31), dizziness (35), headache (10) and tired (43); group 9--all involve increased sweating; group 10--both are indicative of a general sympathetic (adrenergic) reaction in the mouth and throat; and group 11--both involve the sympathetic (adrenergic) reaction of peripheral vasoconstriction.

The Varimax Rotation to Five Factors Solution

The factor analysis in Table 6 reorders the variables into five groups which reflect fairly well-defined body locations and/or related body functions. Again, this shows high content reliability of the items. The three factors VI, VII and VIII are specific factors from the cluster analysis in Table 5 and were included for analysis because their content is fairly independent of the first five factors.

Factor I is essentially the same upset stomach group as group 1 from Table 5. Factor II is essentially the same as group 8, lower visceral and oral reactivity with malaise. Factor III combines group 2, breathing rate increase items, with part of group 4, increase in heart rate items, plus an additional breathing rate item, breathing deeper (14), a decrease in breathing rate item. Perhaps awareness of this area or function of the body is more salient to reporting symptoms there than a sympathetic-parasympathetic awareness dimension. Factor IV combines groups 6 and 7, tension in jaw, shoulders and in general, and two items indicating restlessness, inability to concentrate (40) and move around more (41). Factor V is identical to group 5, a motor/hand to face group.

From the original hypotheses regarding LM-RM differences, one might expect factors III, V and VIII to be reported by LMS, and factors I, II, IV, VI and VII to be reported by RMS.

Lorr et al. [15] factor analyzed personality ratings of outpatients in psychotherapy and found three clusters of body complaints. The first was a factor of "endodermal dysfunction" including the upper and lower portions of the endodermal tube (the alimentary canal as previously referred to in this study) and gastrointestinal symptoms. The second cluster was of "mesodermal origin" including anergic, respiratory and cardiovascular symptoms. The third cluster was of "cerebrotonic order" including primarily skin complaints. These symptoms occur in a layer-like fashion.

Lorr's first group is very similar to a combination of factors I and II from Table 6. His second group seems to parallel factor III, and his third group might include parts of factors V, VI and VIII which are all functions occurring in or associated with the skin.

Thus, the results presented in Table 6 appear to add support for a hypothesis of differential awareness of physiological reactivity in different layers of the body.

RM-LM Differences

The picture of LMS from Table 7 is sparse, only showing the factor motor/hand to face (V). The sympathetic reaction factor VIII and the upper visceral factor III attributed to LMS by Day are reported more often by RMS. Factors I, II, IV, VI and VII do not

even tend to be significant considered over all 148 Ss. The most significant conclusion appears to be that RMS experience the sympathetic reaction of vasoconstriction at the skin's surface and increased heart rate and breathing rate.

The results in Table 8a for male Ss parallel the results already discussed in Table 2. Male LMS report lower visceral and oral reactivity with malaise (generally cholinergic reactivity) and motor/hand to face factors II and V. Male RMS report the sympathetic reaction (VIII) and the speech disruption (VII) factors. Nothing new is added by this analysis.

The results in Table 8b for females show only the motor/hand to face (V) factor for female LMS, and the sympathetic reaction (VIII) and upper visceral (heart) and respiratory reactivity (III) factors for female RMS. The only addition to what has been discussed before is the inclusion of the entire upper visceral factor for female RMS. This result is counter to Day's observation that LMS report sympathetic (adrenergic) reactivity.

Sex Differences

Table 9 shows that females report nearly all symptoms more often than males. Only the upper visceral (III) and motor/hand to face (V) factors do not tend to be answered more often by females. From

the original data the items in factor III are split between males and females; and for factor V females answer the "fingernail" items (23 and 24) more often and males the "pick on skin" and "hand to face" items (47 and 48) more often.

Problems and Suggestions for Further Study

The problems with self-report data are worth noting here. The Ss must report their own awareness of physical reactions. Thus the degree of awareness is a variable that could have the effect of obscuring the results. Also S response set is not explicitly controlled for. Since the results do show a possible sex linked response set, it may be necessary to obtain instrumental measures of physiological reactions to circumvent the problems of awareness and response set.

Another problem is that the basal levels of reactivity for each S are not measured. The effects of this lack may be mitigated if we make the following assumptions. If a S has a low basal level of any symptom, his report of that symptom should indicate its presence in his awareness and be relatively good data. If a S has a high basal level of any symptom, then any report of same under stress would tend to underrate and obscure the effect of that symptom in the data. If we can make the assumption that the great majority

of these 51 symptoms or reactions to stress are not experienced chronically by most of the S population of students (recall the overall average was 3.52, between sometimes and rarely), and are experienced in recognizable states of anxiety or stress, then their data will be relatively good. Most of the effect of high basal level of anxiety Ss will be to obscure the differences in the data. This also suggests one way to account for basal reactivity level by getting an independent measure of anxiety proneness. A second method might be to ask Ss to rate both their basal or rest level of each of these symptoms and the level in stress situations on the same scale and analyze the differences.

A direct way around most of the pitfalls of self-report data would be to make instrumental measurements of selected physiological reactions both before and during experimentally derived stress situations.

Summary

There do appear to be differences in reactions to anxiety or stress when the population is divided on the basis of right vs. left conjugate lateral eye movement. Some of Day's observations have been supported and some not supported. A LM-adrenergic (sympathetic) and RM-cholinergic (parasympathetic) symptom report

dichotomy does not hold up in the data presented; in fact a case might be made in part for the opposite association of RMS with adrenergic reactions and LMS with cholinergic reactions.

An inner vs. outer dichotomy of reactivity is apparent for males. Male LMS report symptoms pertaining to the alimentary canal and to general parasympathetic (cholinergic) reactivity. Male RMS report reactions in the body's outer layers, the muscle sheath and the skin surface. The literature suggests that male LMS may have an indefinite body image as opposed to RMS and that male RMS have greater competitive and achievement drives.

Many specific observations of both Day and Bakan are supported, primarily by the data for males, specifically male RMS have more muscle tics, underarm perspiration, difficulty speaking and a tendency to breathe deeper (which as a cholinergic reaction supports Day), and male LMS are more likely to be alcoholic. The hypothesis of increased heart and breathing rates for LMS is not supported, since female RMS report it. The hypothesis that RMS have a slowing and strengthening of heart and breathing rates gets some support since male RMS report the item breathing deeper. The hypothesis that LMS are preoccupied with obsessive intrusions is supported by the fact that LMS over all Ss and female LMS report the motor/hand to face item(s). RM concern with body outer layers

supports the hypothesis of high muscle tonus in RMS. The speech disruption hypothesis is supported by the data over all Ss and for male RMS; the exception is the difficulty in talking item reported by female LMS. This result, however, also tends to support earlier findings that suggest greater hemispheric integration for females.

The cluster and factor analyses produced groups of symptoms that apply to specific locations on and/or functions of the body and tend to confirm other reports in the literature that an inner vs. outer or a body layer dimension for the investigation of physiological reactivity may be meaningful.

Perhaps the most outstanding result from this study is that given the low level of correlation between the variables sex and eye movement and the set of anxiety symptoms, and the relatively low predictive power this implies, the pattern of responses is as striking as it is.

Problems with self-report data were discussed and suggestions made for further study.

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APPENDICES

APPENDIX A

PROVERBS USED TO DETERMINE CLEM

1. The hardest work is to go idle.
2. A rolling stone gathers no moss.
3. A watched pot never boils.
4. Better a good enemy, than a bad friend.
5. If you can't bite, then don't show your teeth.
6. A poor worker blames his tools.
7. He that lies on the ground cannot fall.
8. Better a bad peace than a good war.
9. They who are mute want to talk most.
10. What saddens a wise man, gladdens a fool.

APPENDIX B

Body Feeling Inventory

Below you will find a list of reactions to stress. This is a study of how often people have these reactions in stressful situations. Examples of stressful situations are:

a) before an important interview b) before talking in front of a group c) waiting in doctor's or dentist's office d) taking an important exam e) being afraid or anxious etc.

Each reaction is to be rated on a 5-point scale on the basis of how often you experience the reaction in a stress situation. The five spaces on the IBM answer sheet correspond to the 5 points of the scale shown below:

1	2	3	4	5
Always	Often	Sometimes	Rarely	Never

Thus if you experience a reaction often you would fill in the number 2 space on the answer sheet. If you never experience the reaction you would fill in the number 5 space on the answer sheet. You may use any number from 1 to 5 in answering.
Consider each of the reactions independently of the others in responding.

---

1. Aware of many bodily reactions.
2. Face hot or flushed.
3. Hands cold.
4. Under arm perspiration.
5. Much sweating.
6. Sweat on palms.
7. Dryness in mouth.
8. Lump in throat.
9. Muscle tension.
10. Headache.

(please go to next page; the scale is repeated at top of page)

1	2	3	4	5
Always	Often	Sometimes	Rarely	Never

---

11. Aware of heartbeat.

12. Heart beats faster.

13. Aware of change in breathing.

14. Breathing deeper.

15. Breathing shallower.

16. Breathing more rapid.

17. Blood rushes to head.

18. Choked up feeling.

19. Upset stomach.

20. Diarrhea.

21. Sinking feeling in stomach.

22. Difficulty in talking.

23. Bite fingernails.

24. Pick on skin around fingernails.

25. Tension in jaw.

26. Bite down on teeth.

27. Muscle tics or twitches.

28. Face gets pale.

29. Shivering.

30. Nausea

31. Vomiting.

32. Increased salivation (mouth waters)

(Please go to next page; the scale is repeated at top of page)

Scale

1 2 3 4 5
Always Often Sometimes Rarely Never

##

33. Fainting

34. Relaxation.

35. Dizziness.

36. Hand shaking or tremor.

37. Inability to speak coherently.

38. Need to empty bladder (urinate).

39. Need to empty rectum (defecate).

40. Inability to concentrate.

41. Move around more.

42. Neck and shoulders feel tight or rigid.

43. Tired.

44. Cold feet.

45. General restlessness.

46. Nervous stomach.

47. Pick on skin or pimples.

48. Smell fingers, scratch scalp or other activities bringing hand to face.

49. Smoke cigarette.

50 . Take a drink (alcohol).

51. Use a tranquillizer.

APPENDIX C

AVERAGE RESPONSE SCORES OVER ALL 51 VARIABLES FOR THE FOUR MAIN SUBJECT GROUPS

Variable	Subject Group			
	M-LM	M-RM	F-LM	F-RM
1	3.17	2.95	2.84	2.97
2	3.54	3.57	3.08	3.00
3	3.90	3.54	3.19	2.82
4	2.71	2.38	2.54	2.42
5	3.17	3.32	3.51	3.36
6	2.80	2.97	2.95	3.06
7	3.24	3.65	3.51	3.55
8	3.83	3.78	3.62	3.64
9	3.44	3.49	3.32	3.30
10	3.93	3.92	3.38	3.42
11	3.17	3.08	3.16	3.00
12	2.93	2.89	2.95	2.67
13	3.39	3.46	3.73	3.42
14	3.68	3.41	3.68	3.67
15	3.71	3.78	3.78	3.67
16	3.49	3.43	3.49	3.27
17	3.95	3.97	3.92	3.88
18	3.83	3.84	3.54	3.70
19	3.63	3.97	3.05	3.12

Variable	Subject Group			
	M-LM	M-RM	F-LM	F-RM
20	4.24	4.59	4.24	4.15
21	3.51	3.57	3.08	3.15
22	3.44	3.38	3.05	3.48
23	3.44	3.76	3.46	3.58
24	3.56	3.78	3.14	3.42
25	4.00	3.95	4.00	4.00
26	4.00	3.78	3.81	3.67
27	3.98	3.51	3.86	3.64
28	4.10	4.03	3.86	3.76
29	4.20	4.16	3.78	3.73
30	4.24	4.30	3.97	4.03
31	4.71	4.73	4.68	4.70
32	4.12	3.89	4.00	4.06
33	4.93	4.86	4.68	4.76
34	2.95	3.22	3.35	3.36
35	4.27	4.27	3.86	4.09
36	3.83	3.73	3.57	3.39
37	4.17	3.84	3.84	3.61
38	3.27	3.57	3.51	3.27
39	3.73	4.00	3.97	3.97
40	3.15	3.14	3.00	3.00
41	2.78	2.76	2.51	2.64
42	3.39	3.22	3.11	3.03
43	3.24	3.41	3.32	3.33

Variable	Subject Group			
	M-LM	M-RM	F-LM	F-RM
44	4.05	3.81	3.70	3.24
45	2.80	2.92	2.46	2.45
46	3.07	3.32	2.86	2.67
47	3.41	3.43	3.62	3.70
48	3.27	3.38	3.11	3.52
49	4.56	4.38	4.51	4.52
50	4.17	4.49	4.43	4.30
51	4.80	4.92	4.86	4.64

APPENDIX D

TABLE OF CORRELATIONS OVER ALL 148 Ss BETWEEN THE 51 ANXIETY VARIABLES, THE 8 GROUP FACTORS FROM THE FACTOR ANALYSIS SOLUTION AND THE VARIABLES SEX, EYE MOVEMENT AND THE PRODUCT INTERACTION OF SEX AND EYE MOVEMENT*

Variable	Factor								Sex	Eye Movement	Sex × Eye Movement
	I	II	III	IV	V	VI	VII	VIII			
46	85	20	33	43	28	36	42	43	20	- 2	- 9
21	70	15	24	43	24	18	47	41	19	- 3	1
19	73	46	24	39	25	21	32	33	32	-10	- 5
30	59	39	24	39	29	31	31	40	15	- 3	1
34	46	-16	21	30	5	32	32	12	14	7	7
50	-10	61	8	- 0	17	- 8	-19	7	- 3	- 6	-13
39	11	58	9	- 2	21	8	- 1	6	- 6	- 8	- 8
38	27	47	18	17	19	17	9	20	1	- 2	-13
20	40	52	6	11	15	2	18	18	13	- 9	-13
31	17	55	9	22	16	- 0	5	32	3	- 2	0
35	29	53	36	30	25	16	22	47	17	- 6	7
33	12	42	22	20	- 0	- 2	9	25	19	- 1	9
51	19	35	4	4	- 4	- 1	- 1	6	9	4	-14
49	- 5	43	2	-18	16	- 8	- 7	9	- 2	5	5
11	36	12	65	30	17	34	31	40	2	6	- 1
12	38	13	66	31	15	35	41	37	5	7	- 5
13	27	23	78	34	17	24	35	38	- 8	6	-10
14	11	25	57	26	9	13	20	31	- 7	8	8
15	20	12	56	39	33	40	31	53	1	1	- 5
16	19	18	76	36	12	24	32	45	4	7	- 4
40	36	20	20	56	36	13	35	18	8	0	1
26	27	- 2	16	63	19	14	25	25	8	9	3
25	37	- 6	28	63	26	21	24	28	- 1	2	1
41	15	5	36	49	30	9	38	33	11	- 3	5

Variable	Factor								Sex	Eye Movement	Sex × Eye Movement
	I	II	III	IV	V	VI	VII	VIII			
42	45	20	40	62	20	32	32	39	12	7	4
9	45	27	32	56	20	32	33	45	7	- 1	- 1
23	16	11	8	12	54	4	10	3	3	- 8	- 4
47	17	29	24	30	62	32	24	25	-11	- 2	1
48	21	19	18	33	50	11	27	6	1	-12	6
24	27	9	13	28	75	11	17	16	15	- 9	2
5	29	6	29	35	20	83	28	- 2	-11	- 1	- 9
4	25	5	18	9	8	65	25	34	4	14	7
6	28	- 0	38	25	19	52	36	39	- 6	- 7	- 2
22	46	7	34	43	21	44	82	30	7	- 8	11
37	46	6	45	44	32	31	82	39	14	14	4
3	41	18	37	34	7	38	36	70	33	17	2
44	29	35	49	41	22	11	22	70	20	15	- 3
1	16	16	30	20	4	16	24	35	9	3	10
2	35	7	53	31	13	39	36	40	27	1	- 1
7	38	18	48	34	22	32	34	30	- 5	-12	-10
8	49	20	45	44	20	27	46	32	9	1	2
10	34	47	36	48	38	10	30	40	26	- 1	3
17	36	25	45	46	11	29	42	35	4	0	- 2
18	60	16	47	60	41	31	60	50	11	- 4	4
27	22	25	41	38	29	20	30	34	- 0	19	7
28	41	39	42	53	38	28	51	58	15	5	0
29	60	37	29	52	23	20	47	52	23	2	1
32	25	36	36	34	23	31	27	25	- 1	5	8
36	38	21	46	35	24	38	47	28	15	7	- 1
43	19	53	23	47	33	12	15	39	- 0	- 5	- 4
45	49	14	36	51	29	25	31	39	23	- 3	- 2

*Table entries $\times 10^{-2}$ = correlations

APPENDIX E

TABLE OF INTERCORRELATIONS BETWEEN THE 8 GROUP FACTORS FROM THE FACTOR ANALYSIS SOLUTION AND THE VARIABLES SEX, EYE MOVEMENT AND THE PRODUCT INTERACTION OF SEX AND EYE MOVEMENT; THE STANDARD SCORE COEFFICIENT ALPHAS OR THE RELIABILITIES OF THE 8 FACTOR GROUPS*

Factor or Variable	Factor								Variable**		
	I	II	III	IV	V	VI	VII	VIII	A	B	C
I	100	31	38	58	33	42	55	50	30	- 3	- 1
II	31	100	26	18	28	5	8	38	11	- 5	- 9
III	38	26	100	49	26	43	48	61	- 1	9	- 4
IV	58	18	49	100	43	35	52	54	13	4	3
V	33	28	26	43	100	24	32	21	3	-13	2
VI	42	5	43	35	24	100	45	35	- 6	3	- 2
VII	55	8	48	52	32	45	100	42	13	3	9
VIII	50	38	61	54	21	35	42	100	38	23	- 0
A	30	11	- 1	13	3	- 6	13	38	100	- 0	5
B	- 3	- 5	9	4	-13	3	3	23	- 0	100	5
C	- 1	- 9	- 4	3	2	- 2	9	- 0	5	5	100
Standard Score Coefficient Alphas											
	80	74	82	75	69	70	80	64			

*Table entries $\times 10^{-2}$ = correlations

**Variable A--Sex

Variable B--Eye Movement

Variable C--Product Interaction of Sex and Eye Movement