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PERSEVERATION IN ORGANIC AND NON-ORGANIC
MENTALLY RETARDED CHILDREN

by

Sarah W. Whitley

Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts
in the
Department of Special Education
of
Appalachian State University

August, 1967

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Abstract

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ABSTRACT

In order to compare perseverative tendencies of organic and non-organic mentally retarded S's, twenty mentally retarded institutionalized central nervous system damaged patients were compared with twenty non-organic institutionalized mentally retarded patients. S's were paired with regard to age, sex, and IQ. The findings of earliest research indicated that the perseveration tendency is greater in organic than in non-organic S's. The latest research did not support these findings. The S's in this study were forced to display response repetition, and the strength of the response repetition for each of the two groups was measured in terms of time and number of trials to satiation.

A box with a combination lock was constructed, and the S's were given the necessary instructions to help them learn the task of opening the combination lock. When the S's could unlock the combination lock, the learning trials were begun, and each successful opening was reinforced with a penny. The criteria of learning for all S's was twenty-five consecutively reinforced openings of the box. Before the twenty-sixth trial, a duplicate lock which required a different combination to open was substituted by the E. As an added incentive to persevere in the task, a twenty-five-cent reinforcer was placed in the box instead of a penny.

Number of trials and time of perseverance, or perseveration at the task, were recorded until the response was satiated.

It has been predicted on the basis of somewhat conflicting research and generalizations in professional circles that organically impaired individuals would persevere more than their non-organic counterparts.

The results of this study were unexpected in that the S's who were not brain damaged tended to persevere in the task longer in terms of time and number of trials than their organically impaired counterparts. Several explanations were explored by the writer to account for the results.

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ACKNOWLEDGMENTS

I wish to express appreciation to all of the persons mentioned below, in no special order, without one of whom this paper would not have been possible.

Appreciation is expressed to Dr. C. Milton Blue, Professor of Special Education at Appalachian State University, who was my major advisor and committee chairman.

I wish to thank Mr. Carl McGimsey who not only gave numerous consultations concerning the apparatus, but constructed the box which was used in the study.

Dr. James C. White, Director of Psychology at Western Carolina Center, Morganton, North Carolina, assisted personally in many ways, and also made it possible to obtain the assistance of Mr. Jerry Lyall and Mr. William Ward of his department.

Special acknowledgment goes to Mike and Randy for still liking their mother while the busy work was being done.

PERSEVERATION IN ORGANIC AND NON-ORGANIC
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Sarah W. Whitley
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Perseveration has been described as the "inability to shift with ease from one psychological activity to another" (Cruickshank, 1961, p. 7). Cruickshank also pointed out that "more precisely it is the apparent inertia of an organism which retards a shift from one stimulus situation to another, resulting in a prolonged after-effect of a given stimulus to which the individual has made an adjustment". He also mentioned that perseveration is the inability to shift from an old situation to a new situation. He further stated that if one uses drill or repetition in setting a learning pattern, perseveration is intensified.

As postulated in topological and vector psychology (Lewin, 1935), the concept of rigidity has been applied to explain the apparent phenomena of perseveration. In this study Lewin used a process of satiation, comparing normals and morons. After satiation, the morons refused to continue with free-drawing, while the normal children did not refuse.

Goldstein (1939), as well as Strauss and Lehtinen (1962), Werner and Thuma (1942), Bender (1938), Piotrowski (1957), Guirdham (1935), and others have all described perseveration as occurring frequently in cases of organic brain damage.

Goldstein (1939) has pointed out that the symptom of "perseveration" has been clinically recognized for a long time in the behavior of

psychotic patients and adults with organic brain disease. Perseveration has been defined as the "persistent repetition or continuance of an activity once begun". In Goldstein's opinion, perseveration is a manifestation of an "abnormal bond" or "forced responsiveness" of the organism to stimuli. It occurs frequently after a good performance has been achieved; the organism then confronted with a new task, continues to repeat the old performance.

Strauss and Lehtinen (1962) indicated that organically brain-injured children showed impairment patterns which led them to the conclusion that the disturbance of perception in brain-injured children represented a disintegration of nervous function. They designed several experiments to investigate the symptom of perseveration with mentally deficient children. Two groups of twenty children each, one group operationally defined by them as brain-injured, and the other non-brain-injured, were involved in the experiments. The first experiment tested performance in reproducing tone patterns. Each child, blindfolded, was asked to repeat the rhythms heard by pressing a key. Morse code patterns were presented. The second experiment consisted of cards of line drawings selected from Carey C. Myers' "Picture Words-Self Teaching Cards". The cards were tachistoscopically exposed for one-fifth of a second in six series of five cards each. The child was asked to tell what he saw.

The results of these two experiments showed that brain-injured children made a significantly greater number of perseverations than the non-brain-injured children. They also found that the perseverations

were of a different kind. Both groups made perseverations which were called immediate or single, i.e., in the series moon, baseball, walnut, wheel, and bell, the baseball was called a moon. The pictures that were presented subsequently in the series were correctly recognized. Two other forms of perseveration, however, occurred predominantly in the responses of brain-injured children. The first of these, a perseveration in which a child repeats a response a number of times, i.e., calling several pictures the moon, was called repetitive perseveration. The term "iterative", or delayed perseveration, was used to describe repetitions which were given two or more trials earlier.

In the tone rhythm experiment, the brain-injured children made twenty-seven percent repetitive or delayed perseverations in all wrong responses; whereas, the non-brain-injured children made only four percent. In the picture-perseveration experiment, the percentages of delayed and repetitive perseverations among the total number of wrong responses were twenty-one percent among brain-injured children, and nine percent among non-brain-injured children. These differences were found to be statistically significant.

Strauss (1962) has pointed out that these two experiments succeeded in isolating two types of perseveration characteristic of the brain-injured child. The single or immediate perseveration occurred equally in both brain-injured and non-brain-injured deficient children, and the repetitive or iterative perseveration occurred more in the brain-injured group.

Lauretta Bender (1938) described perseveration as a characteristic of organic brain damage. She treated perseveration as significant of either infantile, immature behavior, or the effects of organic damage to the central nervous system.

Perseveration has also been noted in the responses of organically impaired individuals on projective, psychological tests. Piotrowski (1957) pointed out that when subjects perseverated one type of percept, especially with anatomical responses, the examination should be considered invalid without an investigation of the degree of perseveration. He, like Werner in his studies, has found a different qualitative aspect to perseveration. He pointed out that Ross discovered that some insecure patients produced spurious Rorschach records with high percentages of anatomical responses. These records were spurious in the sense that the patients could produce another and more diversified record when told to do so, and when asked to abstain from anatomical percepts. Ross found also that those patients who were able to shift, on request, to another kind of percept during the re-examination were sensitive to potential criticism, and apparently for this reason did not associate freely at first. This self-imposed restriction of creativeness resulted in records resembling those produced by patients with intracranial pathology. On the other hand, those patients who continued to perseverate with anatomy, on re-examination were unable to change their responses despite an effort to affect a shift. Piotrowski indicated that these individuals usually had confirmed organic lesions of the central nervous

system. Guirdham (1935) noted that epileptics were particularly likely to produce spurious "M responses", or movement responses on the Rorschach. He pointed out that "this type of patient is characterized also by confabulatory answers, marked perseveration, psychomotility, and an unadapted egocentric extratension".

Perseveration has been associated with organic brain damage to the degree that clinical psychologists have considered this to be indicative of organic brain damage, when the symptom is found. Psychomotor perseveration, the impairment of creative assimilated responses, and the continuance of concrete repetitive responses have all been associated with organic lesions in the central nervous system.

According to Robinson and Robinson (1965, p. 259):

There seems to be some evidence that as a group brain-injured children have trouble in shifting effectively from one stimulus or one kind of response to another. This problem seems to be especially apparent in difficult tasks.

Most investigators have studied perseveration in terms of response repetition. Goldstein's (1939) definition has been quoted earlier. English and English (1958) referred to the relative difficulty in shifting from one task to another, or in changing methods to suit a change in conditions.

In most of the previous works, the experimental conditions have been arranged in such a way that response repetition was inappropriate, and the occurrence of repetition under these conditions has been defined

as perseveration, and therefore, symptomatic of organic brain damage. For example, a series of visual stimuli, auditory stimuli, or complex Rorschach stimuli were presented to the subject when "non-perseverative" responses were expected. When response repetition occurred under these conditions, the examiners have called this re-occurring response tendency perseveration. That is, researchers, for the most part, have studied perseveration under conditions where it has occurred more or less spontaneously, and has not been manipulated by the experimenter.

In review of some of the more recent literature pertaining to the concepts of either rigidity or perseveration, there has arisen some confounding evidence to the original nature of these phenomena.

Cardnuff (1964) wrote about the concept of mental rigidity as a characteristic which distinguishes institutionalized mental defectives from normal individuals. He found, in his study, a most important contradiction of this concept in that the defectives exhibited an ability to vary their own performances, and to make adaptations. He further stated that the generalizations from the research with institutionalized defectives appear to be of a highly dubious nature; one important reason being that the great majority of mental defectives are not in institutions where most of the research is being done.

In another recent study, Friedman and Barclay (1963) compared brain-damaged, mentally retarded individuals with mentally retarded individuals who were not brain-damaged. Again it was found that the hypothesis that brain-damaged, mentally retarded individuals can be

distinguished from non-brain-damaged, mentally retarded individuals by use of psychological test indices, such as the Benton Visual Retention Test and the Weschler Adult Intelligence Scale, was not substantiated.

In an even more recent study devoted to validating the Lewin concept of rigidity, Zigler, Edward, and Butterfield (1966) found the results of their study to be inconsistent with Lewin's formulation. They studied four groups of twenty familial mentally retarded and one group of twenty normal children. The children were given tests for measurement of rigidity. Results of the study were found to be inconsistent with the Lewin-Kounin formulation of rigidity.

Lenner (1965) compared institutionalized retarded brain-damaged individuals with institutionalized non-brain-damaged retarded individuals, using the Weschler Adult Intelligence Scale and the Bender-Gestalt. Results on these two tests were compared, and a negative correlation was obtained from this comparison. Rotation and perseveration were not significantly related to brain damage, contrary to earlier findings.

Kern (1964) studied rigidity as a function of IQ and MA in mentally retarded S's, using negative transfer on a sorting task as an index of rigidity. The ninety S's in his study learned to sort blocks first according to form, then by color. Again, results were found to be inconsistent with the Lewin-Kounin formulation.

Orme (1964) studied the capacity of certain diagnostic measures for detecting brain damage. Psychiatric patients were used, and the groups were divided by diagnostic categories, such as organics,

psychopaths, acute schizophrenics, chronic schizophrenics, hysterics, etc. The Modified Word Learning Test, design recall from the Bender-Gestalt, as well as verbal and non-verbal IQ discrepancies, were used on all patients. He suggested that only when these techniques were used in combination with each other could they be helpful in detecting organic brain damage. He found a high degree of overlays in the scores of the "organics" and the "chronic schizophrenics".

Purpose of the Study

The purpose of this study was to force a condition of response repetition and measure the strength of the perseverative tendency. Perseveration was operationally defined as a tendency to repeat a response when it was no longer appropriate, and the strength of this tendency was measured in terms of the time in minutes and the number of trials to satiation.

The findings of previous investigations revealed confounding results as to the operation of perseveration in brain-damaged children. Some studies have concluded that the perseverative tendency would be different for organic and non-organic groups; whereas, other more recent studies have found inconsistent agreement with this hypothesis. Therefore, this study was carried out to accumulate more data and information regarding perseveration as an enduring feature of brain-injured, mentally retarded children.

The null hypothesis tested was that there would be no significant perseverative differences between the group of retardates medically classified as organically brain-damaged, and the group of retardates which was not so classified.

Method

Subjects: A total of forty S's was utilized for this study. These S's were obtained from Western Carolina Center, Morganton, North Carolina, and Murdoch Center, Butner, North Carolina. Of these S's, thirty-eight came from Western Carolina Center, and two from Murdoch Center. This division was necessary for matching purposes. All of the S's were matched for age, IQ, and sex, with disregard for race. The overall IQ range was 51 through 73, with a mean of 61.3. The CA range was 13 through 19 years, with a mean of 15.7 years. There were nine pairs of females, and eleven pairs of males. Twenty of the S's were mentally retarded inpatient residents of Western Carolina Center, having been medically diagnosed as having central nervous system damage, and these were paired with eighteen mentally retarded inpatients at Western Carolina Center and two patients from Murdoch Center with no evidence of nervous system pathology to form the two group divisions of organic and non-organic. The inter-group matching with regard to IQ was based on an IQ difference of no greater than nine points, with all but four pairs falling within five points. These scores were obtained from the patients' psychological evaluations contained in the medical records

files of the two institutions. Subjects were matched with regard to CA as closely as the patient population would permit, but in no case were the S's paired when the age difference was in excess of twelve months.

In the organic group, the IQ range was 51 through 73, with a mean of 62.4. The CA range was 13 through 19 years, with a mean of 15.5 years. These were paired with a non-organic group having an IQ range of 50 through 70, with a mean of 60.7, and the CA range was 13 through 19, with a mean of 15.5 years for the non-organic group.

Apparatus: The apparatus for the study consisted of a 3/4" walnut veneered plywood box measuring 10" x 6" x 4", finished with two coats of shellac, constructed with a slit in the top measuring 1 1/4" to accommodate a twenty-five cent coin, and a 1" hasp to accommodate a Master combination lock. Another identical Master combination lock was kept by the E below the table level, and out of sight of the S's. The combination series of both locks began with the same number, which was marked on the lock in red paint, with the remaining numbers in the series differing in number and order.

The room in which the experiment was conducted measured 10' x 8' with a 6' x 6' window, two doors, a regular office desk and chair, two bookcases, and other ordinary office material. Utilized in this room for the experiment was a small classroom table-desk and chair, placed against the wall away from the office desk and door, on which the box

was placed. Another chair was available for the E.

Coins of two different denominations were used in the experiment as reinforcement and motivation for the S's operation of the locks. Twenty-five pennies were used per S, and one quarter. The recording instruments used for the experiment were a manual stopwatch, a small spiral notebook, and a pencil.

Procedure: The experiment was conducted at Western Carolina Center, Morganton, North Carolina, during the regular school day, during the summer, between the hours of 9:00 a.m. and 3:00 p.m., with each child being allotted as much time as was necessary for the completion of the trials, or until the S's declared that they wished to stop. The experiment was not begun with any S if the E felt that there was not enough time to allow the S to complete the series of trials.

The S's entered the experimental setting and were given the following directions by the E: "Come in and sit down here". (The S was placed facing the lock). "I want you to do some work learning to open this box. You can make some money if you learn to open the lock so you can take out the money". The E then seated herself beside the S facing the lock and demonstrated the operation of the lock, while giving verbal directions as follows: "See, a red line is painted on the lock. This is the first number. Turn the lock around three times this way to the right, and stop at the red line. Now turn the other way to the left. Pass the red line and stop at ten. Now turn again

this way to the right and stop at the red line again. Look, the lock will open! Now you try it". After the E felt that the S could successfully operate the lock, it was placed on the hasp, locking the lid to the box, and a penny was placed in the box. The S's were then told that they could earn twenty-five pennies, one at a time, if they could open the lock each time it was secured to the box.

When the S's could unlock the combination lock, the learning trials were begun. The E dropped a penny in the box at the beginning of each learning trial, and locked the box with the combination lock. Incorrect trials by the S's that were spontaneously corrected by them were considered as successful operations of the lock. After each successful opening of the lock, the S removed the lock, reached into the box, took out the reinforcement, and collected these during the remaining trials. The criteria of learning for all S's was twenty-five consecutively reinforced openings of the box.

During these learning trials, the E kept a duplicate lock below the table level out of sight of the S's, and before the twenty-sixth trial this duplicate lock, which required a different combination to open, was substituted by the E. At the same time that the locks were changed, as an added incentive and to increase motivation in the task, a twenty-five cent coin was placed in the box instead of the usual penny. The S's did not know that the lock had been changed, and they were not able to open the box to receive the final increased reinforcement.

The number of trials attempted by the S's with the duplicate lock was recorded and timed until the S gave up the task. A trial was operationally defined as turning the previously learned combination to the satisfaction of the S, and accompanied by a decisive "yank". Spontaneously corrected misturns or other manipulations of the lock were not counted as trials for this series. The timing of these trials began with the change of the locks. The E stopped counting trials and timing when the S gave up the task, or began to make other "adaptive" responses, e.g., if the S resorted to conversing with the E, or was apparently avoiding the task by looking out the window. At these times the E encouraged the S's by telling them, "You may work as long as you'd like", or, "I can give you no further help". These encouragements were given at the rate of no more than one per minute, and if the S was unproductive at the end of a five-minute period, he was terminated.

The data was then analyzed by use of the Sign Test (Seigel, 1956) to test the hypothesis of differences between the organic S's and the non-organic S's with regard to perseverative behavior. It was predicted by the E that there would be no significant difference in either direction; therefore, a two-tail test was used. The level of significance was established at .05. Each S's time and trials to response satiation are presented in tables.

Table I (Trials to Satiation) and Table II (Time - Minutes - to Satiation) follow.

TABLE I
TRIALS TO SATIATION

	ORGANIC	NON-ORGANIC	SIGN
1.	57	10	-
2.	25	34	+
3.	22	23	+
4.	36	84	+
5.	23	42	+
6.	27	195	+
7.	10	65	+
8.	16	20	+
9.	48	17	-
10.	42	59	+
11.	4	21	+
12.	74	27	-
13.	27	32	+
14.	12	169	+
15.	5	125	+
16.	15	7	-
17.	115	105	-
18.	12	29	+
19.	8	71	+
20.	22	124	+

$\alpha = 5$
 $N = 20$
 $p = .042$

TABLE II
TIME (MINUTES) TO SATIATION

	ORGANIC	NON-ORGANIC	SIGN
1.	24	7	-
2.	14	21	+
3.	6	20	+
4.	15	47	+
5.	14	14	0
6.	14	70	+
7.	5	27	+
8.	8	10	+
9.	28	7	-
10.	19	28	+
11.	2	9	+
12.	16	21	+
13.	18	15	-
14.	11	69	+
15.	2	52	+
16.	6	7	+
17.	60	38	-
18.	6	14	+
19.	9	41	+
20.	15	58	+

$x = 4$
 $N = 19$
 $p = .02$

Results

The results of the study revealed a statistically significant continuation by the non-organic mentally retarded S's of the learned response to opening the original lock, which had previously been reinforced. Significance levels of .04 for trials, and .02 for time were established by use of the Sign Test. These results are shown in Table I and Table II.

A wide range was found in all categories. The S's with organic brain damage distributed themselves, with regard to number of trials, over a range of 112. S's without known central nervous system damage distributed themselves, with regard to number of trials, over a range of 189.

With regard to time, the organically impaired group performed over a range of 59 minutes; the group of non-organic S's distributed themselves over a range of 64 minutes.

The non-organics showed more variability in the number of their response trials, and slightly more variation in their time to response satiation. The findings were unexpected. The non-organic S's persevered longer at the task, utilizing more trials, although there was more variability in this group, and also used more minutes to response satiation.

Discussion

The findings of the earliest research indicated that an organically impaired individual tends to persevere and maintain non-reinforced behavior on testing longer than a non-organically impaired individual.

However, more recent research indicated that there is no difference in perseverative behavior in the two groups. The E expected to find the organic mentally retarded S's, having reached the same criteria of learning as the non-organic mentally retarded S's, would also perseverate the learned response, and continue the response longer than their non-organically impaired counterparts. The results of this study did not support these expectations.

A number of factors may have confounded the findings, but there even remains the possibility that the usual concepts with regard to perseveration may not be entirely applicable to the mentally retarded, especially if the response has not been reinforced by many "over learning" trials. For example, the mentally retarded child may not perseverate behavior until it has become a long-term, well-established response, and the twenty-five consecutively reinforced trials may not have been enough to establish an enduring response. Ellis (1963) described the learning of the mentally retarded child in terms of "stimulus trace". The mentally retarded child, according to this theoretical position, displayed poor memory and poor recall, especially for responses which did not remain in his immediate adaptive response repertoire, i.e., the mentally retarded child, according to Ellis, needs to frequently use a response in order for it to be maintained.

It is possible that in order to demonstrate differences in perseverative behavior between organic and non-organic mentally retarded S's with this particular experimental model, many more reinforced

trials would be required before the response was established firmly enough, so that the organically impaired S's would over-utilize and continue to engage in the perseverative behavior in a repetitious and compulsive manner.

This study may have illustrated the "short attention span" of mentally retarded, organic S's, as opposed to the more adaptive and persevering qualities found in non-organic, mentally retarded S's. Cruickshank (1961, p. 7) indicated that perseveration is the inability to shift, or more precisely illustrates the apparent inertia of the organism. This study may illustrate the inertia of the organically impaired S, and demonstrates the difficulty in "setting" a response in the organically impaired individual.

The data did not lend themselves to the usual parametric statistical manipulation, which allows one to examine the variance. It was felt, however, judging from the wide range found in both number of trials and time in minutes used, that the results may be somewhat suspect. The E feels that with replication, more controls with regard to matching, more homogeneous populations could be delineated, and different results may be obtained. The S's were matched on CA to within one year, and on IQ's to within nine points. The rather wide age range possibly contributed to the excessive variance.

Summary

In order to compare perseverative tendencies of organic and non-organic mentally retarded S's, twenty mentally retarded inpatients

of Western Carolina Center, Morganton, North Carolina, with an IQ range of 51 through 73, having been medically diagnosed as possessing central nervous system damage, were paired with eighteen mentally retarded inpatient residents of Western Carolina Center and two inpatients from Murdoch Center, Butner, North Carolina, between the ages of 13 and 19, with an IQ range of 50 through 70, with no evidence of central nervous system pathology. Findings of earlier research have suggested that the perseverative tendency would be different for the organically impaired and those not organically impaired. The most recent research does not support the earliest findings. In order to test the conflicting outcomes of earlier and more recent studies, S's in this study were forced to display response repetition, and the strength of the response repetition for each of the two groups was measured in terms of trials and time.

A box with a combination lock was constructed, and the S's were given the necessary instructions to help them learn the task of opening the combination lock. When the S's could unlock the combination lock, the learning trials were begun, and each successful opening was reinforced with a penny.

The criteria of learning for all S's was twenty-five consecutively reinforced openings of the box. Before the twenty-sixth trial, a duplicate lock was substituted by the E, which required a different combination to open. As an added incentive to persevere in the task, a twenty-five cent reinforcer was placed in the box instead of a penny.

Trials and time of perseverance, or perseveration at the task, were recorded until the response was satiated.

The results were unexpected in that the non-organic mentally retarded S's tended to persevere in the task longer than their organic counterparts in both time and trials. The E offered several possible explanations to account for these results.

TABLE III - COLLECTIVE DATA

ORGANIC										NON-ORGANIC									
<u>Pair</u> <u>No.</u>	<u>IQ</u>	<u>Age</u>	<u>Sex</u>	<u>Time In</u> <u>Minutes</u>	<u>No. Of</u> <u>Trics</u>	<u>IQ</u>	<u>Age</u>	<u>Sex</u>	<u>Time In</u> <u>Minutes</u>	<u>No. Of</u> <u>Trics</u>	<u>SIGN</u> <u>FOR</u> <u>TIME</u>	<u>SIGN</u> <u>FOR</u> <u>TRIES</u>							
I	70	13	F	24	57	66	13	F	10	10	-	-							
II	53	15	F	14	25	52	16	F	21	34	+	+							
III	62	14	M	6	22	63	13	M	20	23	+	+							
IV	71	15	M	15	36	70	16	M	47	84	+	+							
V	55	16	M	14	23	50	17	M	14	42	0	+							
VI	63	13	M	14	27	63	13	M	70	195	+	+							
VII	64	16	F	5	10	61	16	F	27	65	+	+							
VIII	70	18	M	8	16	63	17	M	10	20	+	+							
IX	70	15	M	28	48	62	15	M	7	17	-	-							
X	52	13	F	19	42	53	14	F	28	59	+	+							
XI	69	18	M	2	4	68	17	M	9	21	+	+							
XII	57	19	M	16	74	54	19	M	21	27	+	-							
XIII	52	13	F	18	27	58	14	F	13	32	-	+							
XIV	53	16	F	11	12	52	16	F	69	169	+	+							
XV	51	19	F	2	5	50	19	F	52	125	+	+							
XVI	54	16	M	6	15	58	15	M	7	7	+	-							
XVII	71	16	M	60	115	70	15	M	38	105	-	-							
XVIII	70	18	M	6	12	61	18	M	14	29	+	+							
XIX	68	15	F	9	8	70	16	F	41	71	+	+							
XX	73	15	F	15	22	70	14	F	59	124	+	+							

N = 20

Mean IQ = 62.4

Mean Age = 15.5

Mean Time in Minutes = 14.6

Mean No. of Trics = 30.0

N = 19

Mean IQ = 60.7

Mean Age = 15.5

Mean Time in Minutes = 28.7

Mean No. of Trics = 62.9

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