1980

An investigation for the effects of psi on heart rates

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AN INVESTIGATION FOR THE EFFECTS OF PSI ON HEART RATES

A Thesis
Presented to the
Faculty of
California State College,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Psychology

by
Jacqueline K. Stewart
June 1980

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Approved by:

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Chairman

Date

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ABSTRACT

Five pairs were created from 10 volunteer participants in an investigation for effects of psi on heart rates. Each pair's data was obtained separately by computer, which gained input directly from electrocardiographs. Subject and target were isolated from one another. After a baseline session, the subject received biofeedback training on his or her own heart rate's control. During subsequent experimental conditions the subject received various combinations of visual analog and visual digital feedback on either or both heart rates. During experimental conditions the subject's instructions were "Hold your own heart rate steady and change the target's toward yours. Make your heart rates match". A session was completed with a postbaseline measure. Data for each pair were analyzed separately by condition, with descriptive analyses. Results suggest that four out of five pairs may have shown effects of psi on heart rates.

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AN INVESTIGATION FOR THE EFFECTS OF PSI ON HEART RATES

Numerous difficulties are encountered in parapsychological research. General technological advancement, additional data, and perhaps a major paradigm shift may be necessary before a truly encompassing theoretical explanation of psi might be generated (Chari, 1977; Stanford, 1977; Rao, 1977, 1977, 1978; Braude, 1979; Pratt, 1979; White, 1979). Therefore, the present investigation for effects of psi on heart rate does not intend to support a specific theory, but rather, add to the data base for generation of theory. Two major bodies of literature relevant to the present study will henceforth be reviewed. The first of these two review sections concerns emergent experiment wise patterns of cognitively influenced variables which seems to generally facilitate or inhibit psi performance. The present study will attempt to incorporate and/or monitor these variables. The second of the two review sections deals specifically with previous research on psychophysiological correlates to psi performance.

Experimental Patterns

Over time, variables relevant to psi performance have emerged from many researchers' efforts, including: (1) attitudinal variables; (2) novelty of test stimuli; (3) experimenter variables and rapport; (4) target types held in common among the participants; and (5) emotional intensity and complexity of the stimuli used in testing.

Attitudinal Variables. The facilitating attitudes indicated by previous research have been difficult to measure reliably, creating problems with generalization. However, some strong experiment wise patterns have emerged (Palmer, 1977). The most predominant pattern concerns the effects of belief in ESP, more commonly known as the sheep-goat effect. Persons believing in ESP (sheep) have a higher ESP scoring ability than do persons who do not believe in ESP (goats). Goats often score significantly below chance expectancy (Van de Castle, 1957; Schmeidler and McConnell, 1958; Osis and Dean, 1964; Stanford, 1964; Taddonio, 1975; Palmer, 1977).

Mood has also been shown to be a relevant attitudinal variable in psi performance. Generally, previous research shows that the happier and more easily expressed moods coincide with successful psi performance, while the unhappy, less consistently expressed moods coincide with significant below chance scoring (Kanthamani and Rao, 1972, 1973; Friedman, Schmeidler, and Dean, 1976; Stanford, 1976; Carpenter, 1977).

Novelty of Stimuli. Individual ability to exhibit psi varies. In an extensive review of intrasubject variables, Carpenter (1977) suggests that the commonly observed position effects, eposodic declines, and long term declines in psi performance could be due to the psi test's novelty fading away and/or some sort of neurological fatigue or inhibition. Emphasis upon the importance of maintaining stimulus novelty is upheld by the findings of Maimonides research (Ullman, Krippner, and Vaughan, 1973). However, there are studies using highly gifted subjects which show reduced psi performance under continuously novel conditions (Rhine, 1934; Tyrell, 1936). Therefore, Carpenter (1977) tentatively concludes that novelty facilitates psi among non-gifted subjects, the great majority, who are not able to produce stable psi hit performances.

Experimenter Variables and Rapport. The attitudes of the experimenter, particularly those of the data collector, seem to play an important role in whether significant results are obtained (Osis and Dean, 1964; Kennedy and Taddonio, 1976; Taddonio, 1976; Thouless, 1976; White, 1976, 1976). Some researchers have been consistently unable to obtain significant results, while others often obtain significance. White's (1977) review of the experiment wise findings indicates that evidence of psi seems to depend on the following experimenter variables: (1) how a subject is handled by the experimenter; (2) a favorable subject-experimenter rapport; and (3) the personal motivation of the experimenter. In conclusion White (1977) emphasizes the need for psi researchers to routinely record those experimenter variables.

Target Types Held in Common. It is theorized that target material with common salience and meaning for the participants may be more easily transmitted, thus, enhancing psi performance (Carpenter, 1977). Also shown to elicit more psi hits are organic target materials and organically screened target materials, as opposed to inorganic target materials and screening (i.e. glass screens), which have been tied to psi missing (Chauvin and Darchen, 1963; Roll and Pratt, 1968).

Emotional Intensity and Complexity. Closely tied to the importance of novelty of the stimuli are findings concerning the emotional intensity and complexity of the test stimuli. Tests using emotionally intense, meaningful, complex stimuli appear to enhance psi performance, and to postpone the performance decline processes (Ullman, Krippner, and Vaughan, 1973; Moss, 1975). However, much difficulty is encountered with complex stimuli, such as pictures, as they can be nearly impossible to quantify, especially when below chance scoring is to be considered. The dependent measure in psi research is often from the subject's verbal reports, which require content analysis for establishing percentage accuracy. Verbal reports also coincide poorly in time with the onset of psi events and suffer much perceptual distortion during information processing (Moss, 1975). As Morris (1977) suggests, physiological responses should coincide more closely in time with the onset of psi. They should, therefore, be less susceptible to the blockades of attentional filtering (Irwin, 1978, 1978) and perceptual distortions posed by interacting variables such as attitude, emotional impact, novelty, and stimulus complexity (Moss, 1975; Morris, 1977; Honorton, 1977). As Davis and Braud (1979) also suggest, there is evidence that the autonomic nervous system may be a more sensitive indicator of psi information reception than cognitively elaborated verbal responses. If physiological responses are used as dependent measures, indices of psi at the early stages of processing might be established, eventually leading to an understanding of the processing elements themselves (Beloff, 1974; Morris, 1977).

Psychophysiological Correlates of Psi

The majority of investigations on the effects of psi on psychophysiological responses have concentrated on electroencephalogram (EEG) correlates, which are exceptionally difficult to reliably measure and interpret (Tart, 1963; Duane and Behrendt, 1965; Targ and Puthoff, 1974; Kelley and Lenz, 1975; Venturino, 1978). Lloyd (1973) and Millar (1976) investigated for cortical evoked potential correlates in psi, obtaining mixed results. Levin and Kennedy (1975) used measures of contingent negative variation (CNV) in cortical potential in two studies investigating the presence of psi. Their preliminary study produced significant results, while the confirmatory study did not. As Morris (1974) suggests, the differences in the nature of the EEG tests, procedures, hypotheses, and subject characteristics make conclusions difficult to draw, though there may be some relationship between increased alpha activity, as a general indicator of internal state, and enhanced psi performance.

Several studies have investigated for galvanic skin response (GSR) correlates to psi. Results have been mixed. In an investigation by Braud (1977) the agent-experimenter directly influenced the target's GSR activity. Hettinger

(1952), Tart (1963), Rice (1963), and Davis and Braud (1979) have also shown some evidence of GSR correlates in successful psi performance. Studies by Barron and Mordkoff (1968), Dean (1969), Sanjar (1969), and Beloff, Cowles, and Bate (1970) did not show evidence of relationships between GSR and psi.

Researchers have also approached the study of psi through vasomotor activity. Figar (1959), using a plethysmograph, found that a receiver's peripheral vasomotor activity increased while an agent performed mental arithmetic. Tart (1963) showed more active plethysmograph responses in subjects while a distant agent was receiving shocks than during control periods. Esser, Etter, and Chamberlain (1967) found indications of receivers' vasomotor activity increasing when agents' attention was on phrases containing nouns important to the receiver, as opposed to neutral, control phrases. Other researchers have also found indications of receivers' vasomotor activity increasing when agents attended to sentences containing names important to the receivers (Dean, 1962, 1969; Dean and Nash, 1967). Sanjar (1969) found no relationships between receivers' vasomotor activity and agent arousal from loud noise or psychiatric interview.

In summary, the more promising line of research on the psychophysiological correlates of psi seems to be in the area of vasomotor response. Further control of cognitive elaborations might be gained if a subject would attempt to transmit a vasomotor response directly to a target person, as facilitated by supplying the subject with biofeedback. In this manner of more direct approach perceptual distortions posed by interacting cognitive variables might be minimized, therefore improving reliability. The participants might find the direct and instantaneous biofeedback on heart rate simple to interpret. Biofeedback on heart rate would certainly qualify as being novel for most persons, as well as utilizing an organismic target material with common salience and meaning.

A baseline measure of heart rate will establish mean heart rate and mean variance for each subject and target. The subject will be instructed to hold his or her heart rate steady and trained to do so by biofeedback. Thereafter, if the heart rates of the subject and target correlate with one another while the subject is receiving no feedback on the target's heart rate, then a successful psi performance is indicated. If a correlation between heart rates is shown while the subject is receiving feedback on the target, then: (1) biofeedback is responsible if the subject's mean variance is greater than the subject's mean baseline variance; or (2) psi is responsible if the subject's mean variance is the same or less than the subject's mean baseline variance, while the target's mean variance is greater than the target's mean baseline variance.

METHOD

Subjects

Fifteen volunteer friends and acquaintances of the data collector participated in a pilot study investigating for effects of psi on heart rate. Each pilot volunteer alternated subject and target roles, in various pairings with other volunteers. Heart rates were manually calculated from electrocardiogram (EKG) trace images, and correlational analyses performed. According to pilot results five pairs of volunteers have evidenced effects of psi on heart rate. Based on these pilot results, 10 out of 15 pilot volunteers were selected for the present experiment. These 10 were divided into five pairs according to the partner with whom their pilot performance was most successful, and assigned to subject or target roles based on their best pilot performance as a subject or a target within that given pair.

Before beginning the experiment each participant filled out a questionaire concerning demography and attitudes. (See copy of the questionaire in Appendix A.) Each pair of partners will be referred to by number.

Pair numbers, role assignments and summary of questionaire information are presented in Table 1.

Table 1

Pair Numbers, Role Assignments, and Summary of Questionaire Information

	Pair 1	Pair 2	Pair 3	Pair 4	Pair 5
Subject/Target					
Role Assignment by Initials	MR/RJ	ES/BB	JR/BH	SS/WH	GM/SM
Age	27/21	25/28	34/33	20/35	28/30
Sex	M/M	F/F	F/F	F/M	M/F
Belief in ESP *	3/3	3/3	1/2	1/0	3/3
Enthusiasm about Experiment	yes/yes	yes/yes	no/yes	no/yes	yes/yes
Feeling of Rapport for Partner **	Hi/Neu	Hi/Hi	Hi/Hi	Neu/Hi	Neu/Hi

* Scale from 0 to 3 is based on the number of "yes" answers to four questions about belief in ESP; 0 = no belief, 1 = belief, 2 = strong belief, 3 = strongest belief

** Hi = high rapport, Neu = neutral, No = no rapport

Five participants (MR, JR, BH, WH, and GM) were graduate students in the Department of Psychology, California State College, San Bernardino. One target (SM) was an undergraduate in a different department at the same college. The remaining participants (ES, BB, RJ, and SS) were from various middle-class professions in San Bernardino. The persons in Pair 2 had been friends for five years prior to the experiment; those in Pair 3 had been friends for one year. The remaining partners had been strangers at the pilot's onset, and did not correspond with one another between the pilot and experiment. (See Appendix B for the data collector's attitudes, motivation, and rapport with participants.)

Apparatus and Functions

The lab room was illuminated by fluorescent lighting. The subject was seated in a screened off area of the lab, facing a black and white video monitor with a 19 inch screen. The target was seated in a 2½ by 3 by 6 foot sound insulated, isolation booth, located in the lab room also occupied by the experimenter and subject, who were approximately four and ten feet distant from the booth, respectively.

The EKG's of each pair were recorded simultaneously on a Lafayette, model 76101, Data Graph. Lafayette basic plate electrodes, model 76628, were affixed with Medcraft Electrode

Cream 2302 on right and left forearms, and the right inner ankle bone. Output was transduced to the Data Graph through preamplifiers modified to increase gain by 10 dB, with 60 Hz filters set "on". Visual analog feedback was sent from the Data Graph print out (paper dispensed at 5 mm per sec) by a video camera to two monitors, the one viewed by the subject, and to one of two 12 inch monitors viewed by the experimenter. To block out either the subject's or the target's Data Graph trace images on these monitors, according to the condition involved, a framing apparatus was mounted in front of the lens of the camera which was suspended over the Data Graph. To block these monitor screens entirely, the aperture of this lens was closed. The pen tips of the Data Graph showed on these two monitors. The subject's EKG was displayed on the lower half of the monitor screens, the target's on the upper half.

Electronic output from the Data Graph was fed into two separate, identical electronic logic systems; one system for the subject and the other for the target. Within each system, output from the Data Graph went to a pulse detector where a brief digital signal, coincident with the "R" portion of the EKG wave packet, was generated. This digital signal output from the pulse detector controlled an electronic timer. The timer was turned on, off, and reset by alternate pulse detector outputs, enabling the measurement of heart rate by supplying the length of time between two R pulses in ms. The R pulse time period in ms was accumulated in a counter. The counter was scanned by electronic logic and read into a computer, which was specially programmed to make the following calculations from each successive input from either the subject or target counter: (1) heart rate per minute; (2) the difference between subject and target heart rates (difference score); and (3) during the subject training condition, the changes within the subject's heart rate compared to the previous measurement of the subject's heart rate (change score). The computer output was stored on a disc and concurrently displayed on two 12 inch monitors. One monitor displayed the video readout to the experimenter. The video readout on the other monitor was picked up by a second video camera, and fed into a Sony Special Effects Generator (model SEG-2). This generator was used to control a display of digital feedback (difference or change scores) in the upper right hand corner of the subject's monitor screen. The date, time, subject name, target name, and condition (run) number were stored and displayed on the two monitors at the onset of each run. The run number, seconds into the run, heart rates and difference or change scores were stored and displayed each time the computer calculated heart rates, amounting to approximately 20 recordings per minute. The length of each run time, and each total experimental session time on line were also stored.

Procedure

Upon entering the lab each participant filled in a questionaire. In a congenial conversation with the data collector, during the 15 to 20 minutes necessary for electrode application, the pair was instructed to relax, remove wrist watches, and reminded that after the experiment began no breaks would be taken. Participants were told the experiment would last approximately 30 minutes from the time EKG measurements began, and to hold very still during the session to avoid electromyogram (EMG) artifacts. The pair was seated, the clarity of EKG's checked, and the lab lights turned off. The pair was told that the experimenter rapping on the isolation booth would be a signal to the target to become passively receptive to the subject, after which there would be no further communication with the target for the remainder of the experimental session.

The session began with Prebaseline 1 (PRB1/O) during which the participants were to block the experimenter and one another by concentrating on outside personal matters of their choice. PRB1/0 lasted for six minutes. No feedback was given. (The code of "0" after the slash reflects that no digital feedback was given.)

The locations and meaning of the subject and target EKG trace images on the subject's monitor screen were then explained to the subject, including how to see the R portion of the wave packet. The screen location and meaning of the change score feedback (C) was explained to the subject as a digital display showing increase or decrease (+ or -) in heart beats per minute according to the computer's previous measurement of the subject's heart rate. During the three minute subject training condition that followed, the subject viewed the EKG trace image of the subject's heart beat only and C feedback (SHBO/C). The subject was instructed to learn control over his or her heart rate by keeping the C numbers as small as possible.

After SHBO/C the experimenter signaled the target by rapping on the isolation booth. Then the difference score (D) feedback was explained to the subject as a digital display showing the difference between subject and target heart rates per minute according to each successive pair of computer measurements. (The meaning of the D sign, + or -, was not explained.) Before each subsequent experimental condition the subject was instructed as follows: "Keep your own heart rate steady and move the target's heart rate toward yours. Make your heart rates match."

During the first experimental condition (3 min) the subject received subject trace image only, and D feedback (SHBO/D). In the next experimental condition (3 min) the subject received target trace image only and D feedback (THBO/D). In the following experimental condition (3 min) the subject received subject and target EKG trace images, and D feedback (STHB/D). In the final experimental condition (3 min) the subject received subject and target EKG heart beat trace images, and no digital feedback (STHB/O).

The experimental conditions were followed by Postbaseline 1 (POB1/O), lasting for six minutes. Instructions to the subject were to relax, and no feedback was given.

Pairs 4 and 5 received all the experimental conditions within the initial session. The STHB/O experimental condition was added into the procedure to control for possible cognitive task difficulty involved in the D feedback. When this condition was added Pairs 1, 2, and 3 had already completed their initial sessions. During the weeks that followed those three Pairs were called for a return session consisting of Prebaseline 2 (PRB2/O), STHB/O, and Postbaseline 2 (POB2/O). The instructions, duration, and feedback of the return session baselines were the same as for those in the initial session. (For a summary of operational codes of feedback conditions see pp 22.)

The participants were thanked and told to expect a letter explaining the results of their psi performance.

RESULTS

A controversy exists concerning the appropriateness of the statistical approach utilized in this study. The use of Pearson's product moment correlational analyses may violate the assumption of independence within heart rate measurement, increasing the likelihood of Type I error (Hannan, 1955, 1955; Kelejian and Oates, 1974). However, researchers have used Pearson's in analyzing the results of ipsative type designs, as the ipsative approach creates peaked distributions which result in conservative tests (Brazier and Casby, 1951, 1952; Brazier and Barlow, 1955, 1956). Because of this unresolved statistical controversy, definite conclusions can not be drawn from the results of this investigation. A more appropriate analysis would be a cross correlational time series analysis which measures regression and correlation in a similar manner to Pearson's. However, since cross correlational time series analysis is not well known by conventional statisticians and could not be applied to the present study, the Pearson's method was utilized as a simplified time series approach.

Each Pair's data was analyzed separately by run, and by beginning and ending seconds within each run. The heart rates for the same period were compared by a Pearson's product moment correlation coefficient as a simplified time series analysis. A full summary of results obtained for each Pair by session and the sequence of conditions received is presented in Table 2. The significance of coefficients is not reported due to the possibility that the measurements were not independent. Coefficients will be presented in terms of relative magnitude. Graphs 1 through 41, representing each Pair's heart rates in the order of conditions received, are presented at the end of the results section. A paired analysis showed that within all Pairs heart rates continued to differ significantly from one another through sessions and conditions, $.02 > p < .001$. However, this finding can not be regarded as fully reliable, because of the possibility that the measurements were not entirely independent.

Pair 1

During the initial session the SHBO/D experimental condition indicated a possible correlation between heart rates, $r = +0.248$, $df = 77$ (see Graph 3, pp. 28). Further analysis revealed that during the last two and one half minutes of the run the correlation was stronger, $r = +0.424$, $df = 66$.

In the return session POB2/O showed a possible correlation between heart rates, r = -0.239, df = 149 (see Graph 9, pp. 34).

Table 2

Results of Each Pair by Session

and Condition Sequence Received

Pair	Session	Condition Sequence	Analysis Begin-End sec	Subject bpm $\bar{X}$ - SD	Target bpm $\bar{X}$ - SD	r/df
1	initial	PRB1/O	53-281	76- 4	87- 6	+.02/93
		SHBO/C	1-181	79- 3		
		SHBO/D	1-186	79- 7	102- 6	+.25/77
			31-186	79- 7	94- 8	+.42/66
		THBO/D	2-189	78- 4	93- 8	+.08/75
		STHB/D	2-184	77- 5	95- 5	-.04/75
		POB1/O	1-361	74- 4	90- 7	+.02/136
	return	PRB2/O	2-365	81- 4	84- 5	+.03/148
		STHB/O	1-185	82- 4	84- 5	-.06/76
		POB2/O	2-363	81- 4	82- 6	-.24/149
2	initial	PRB1/O	1-135	83- 4	73- 7	+.61/143
			1-118	85- 6	74-11	+.84/46
			181-298	83- 4	71- 3	+.21/44
		SHBO/C	1-183	83- 1		
		SHBO/D	2-191	83- 3	75- 5	+.13/68
		THBO/D	2-186	83- 3	76- 5	+.32/71
		STHB/D	2-185	83- 3	76- 6	+.23/74
		POB1/O	2-364	83- 3	76- 6	-.03/143
	return	PRB2/O	2-363	84- 3	78- 3	-.09/143
		STHB/O	2-177	82- 3	78- 3	-.09/70
		POB2/O	2-364	83- 3	78- 4	+.02/151
3	initial	PRB1/O	2-362	86- 6	83- 4	+.05/141
		SHBO/C	104-345	80- 7		
		SHBO/D	3-191	80- 6	87- 8	-.13/71
			3-118	79- 6	87- 4	-.34/45
		THBO/D	2-193	81- 6	100- 9	-.34/81
		STHB/D	3-182	78- 6	89- 5	-.15/74
		POB1/O	2-357	83- 7	88- 4	+.07/151
	return	PRB2/O	2-301	83- 4	68- 6	-.12/108
		STHB/O	3-177	80- 7	72- 6	+.43/65
		POB2/O	2-301	83- 4	68- 6	-.12/108
4	initial	PRB1/O	2-362	83- 3	69- 7	-.34/126
			181-362	83- 3	69- 8	-.37/65
		SHBO/C	2-182	78- 2		
		SHBO/D	3-186	78- 3	62- 5	+.04/63
		THBO/D	2-183	76- 2	60- 4	-.08/58
		STHB/D	2-176	76- 2	72- 7	+.09/64
		STHB/O	2-183	75- 2	70- 6	-.14/65
		POB1/O	5-360	76- 3	71- 7	-.26/127

Pair	Session	Condition Sequence	Analysis Begin-End sec	Subject bpm $\bar{X}$ - SD	Target bpm $\bar{X}$ - SD	r/df
5	initial	PRB1/O	2-125	71- 4	85- 11	-.16/41
		SHBO/C	2-184	67- 1		
		SHBO/D	61-184	70- 2	81- 4	-.15/45
		THBO/D	1-183	71- 3	80- 3	-.11/71
		STHB/D	2-187	72- 2	82- 5	-.04/67
		STHB/O	2-189	70- 3	85- 4	-.15/73
		POB1/O	2-364	68- 4	86- 5	-.05/131

Conditions:

PRB1/O = initial session, prebaseline, no feedback, 6 min
PRB2/O = return session, prebaseline, no feedback, 6 min
POB1/O = initial session, postbaseline, no feedback, 6 min
POB2/O = return session, postbaseline, no feedback, 6 min
SHBO/C = subject training, subject trace image and C feedback, 3 min
SHBO/D = experimental condition, subject trace image and D feedback, 3 min
THBO/D = experimental condition, target trace image and D feedback, 3 min
STHB/D = experimental condition, both trace images and D feedback, 3 min
STHB/O = experimental condition, both trace images, 3 min

Pair 2

In the initial session, during PRB1/O a substantial correlation between heart rates occurred, r = +0.608, df = 143 (see Graph 10, pp. 35). Further analysis revealed that there was a stronger correlation within the first two minutes of the condition, r = +0.837, df = 46. During the THBO/D experimental condition a notable correlation between heart rates again occurred, r = +0.32, df = 71 (see Graph 13, pp. 38). During the STHB/D experimental condition there was a possible correlation between heart rates, r = +0.229, df = 74 (see Graph 14, pp. 39).

During the return session of Pair 2 no correlations between heart rates occurred.

Pair 3

In the initial session there was no correlation between heart rates over the full three minutes of the SHBO/D experimental condition, but there was a notable correlation during the first two minutes of this run, r = -0.34, df = 45 (see Graph 21, pp. 46). In the THBO/D experimental condition there was again a notable correlation between heart rates, r = -0.34, df = 65 (see Graph 22, pp. 47).

During the return session of Pair 3 in the STHB/O experimental condition a substantial correlation occurred between heart rates, r = +0.432, df = 65 (see Graph 26, pp. 51).

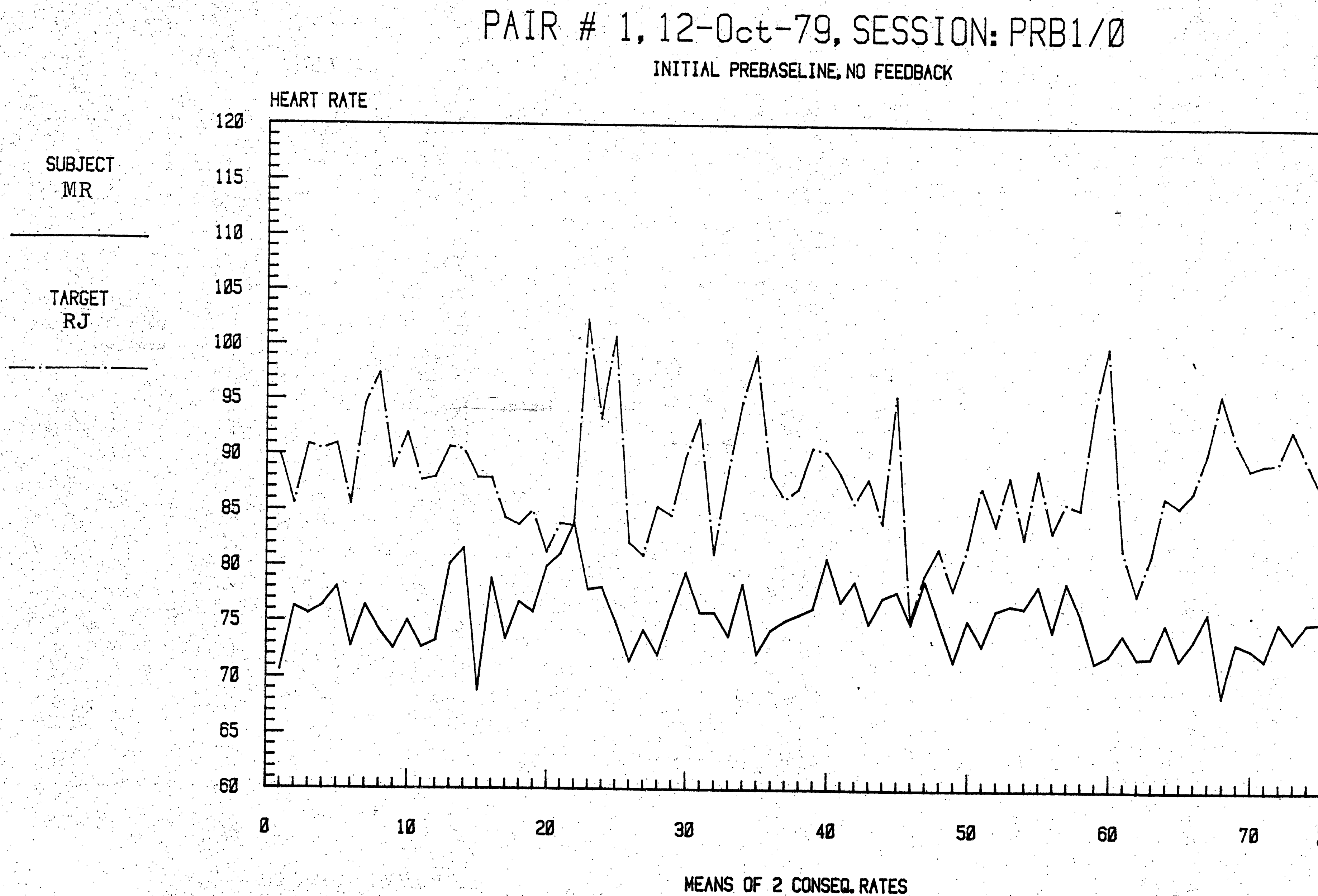
Pair 4

During the initial session in PRB1/O a notable correlation between heart rates occurred, r = -0.343, df = 126 (see Graph 28, pp. 53). Further analysis revealed that the correlation remained constant during the last three minutes of this baseline, r = -0.372, df = 65. No correlations occurred during the experimental conditions. During POB1/O a possible correlation was again revealed, r = -0.262, df = 127 (see Graph 34, pp. 59).

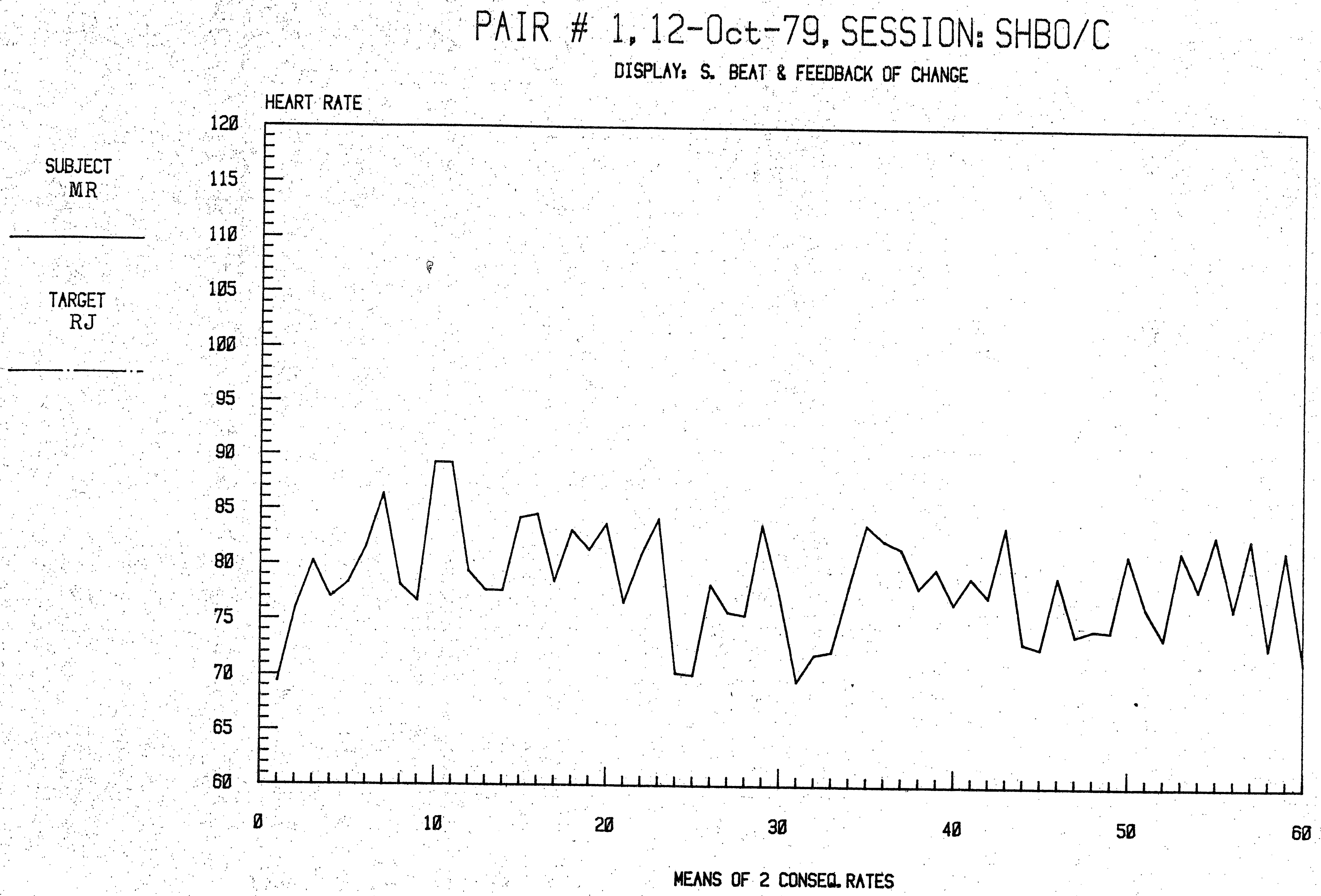
Pair 5

No correlations occurred between heart rates during the entire initial session.

Graph 1


PAIR # 1, 12-Oct-79, SESSION: PRB1/Ø
INITIAL PREBASELINE, NO FEEDBACK
HEART RATE
12Ø
115
11Ø
1Ø5
1ØØ
95
9Ø
85
8Ø
75
7Ø
65
6Ø
SUBJECT
MR
TARGET
RJ
Ø
1Ø
2Ø
3Ø
4Ø
5Ø
6Ø
7Ø
MEANS OF 2 CONSEQ. RATES

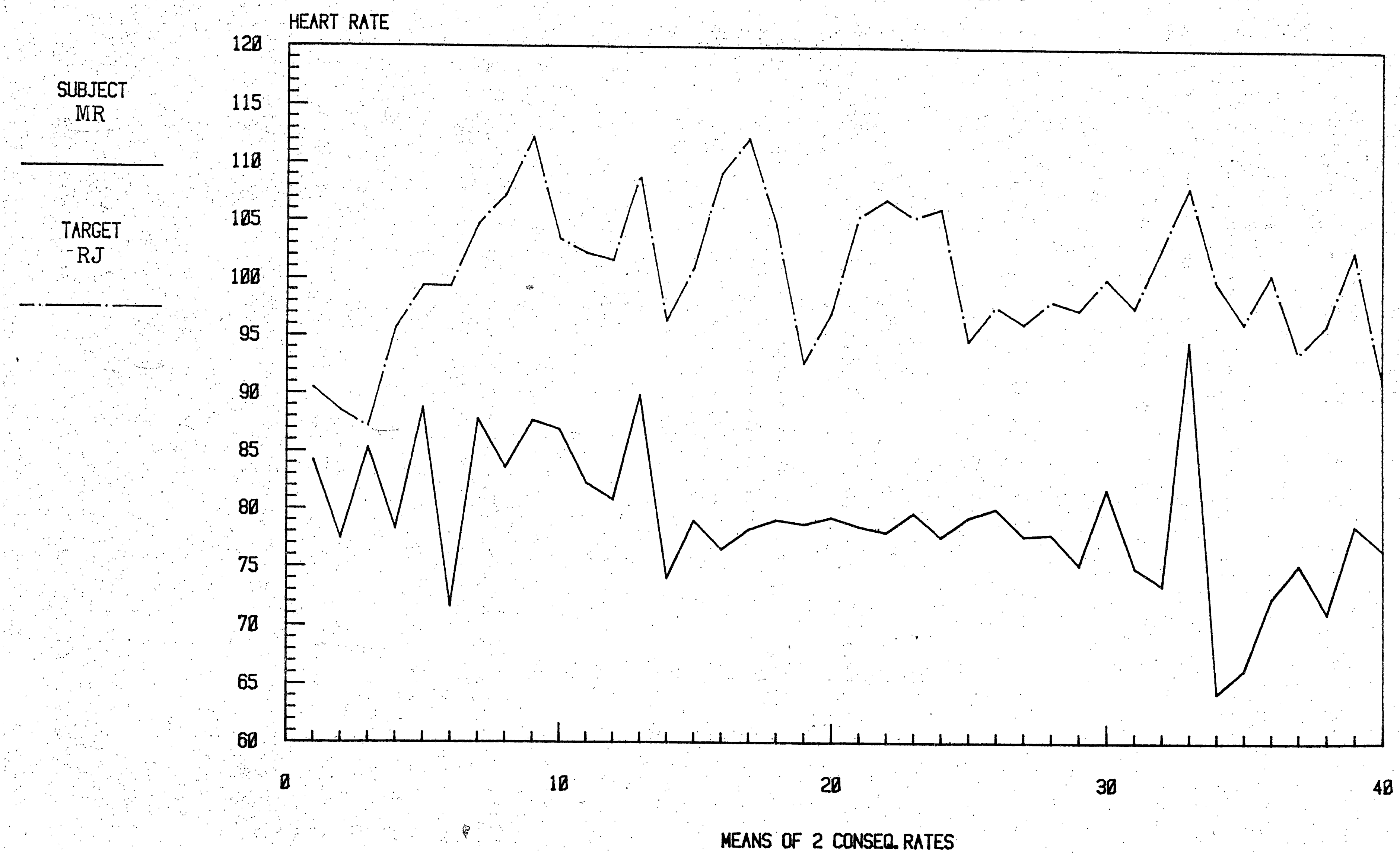
Graph 2


PAIR # 1, 12-Oct-79, SESSION: SHBO/C
DISPLAY: S. BEAT & FEEDBACK OF CHANGE
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
50
60
MEANS OF 2 CONSEQ. RATES

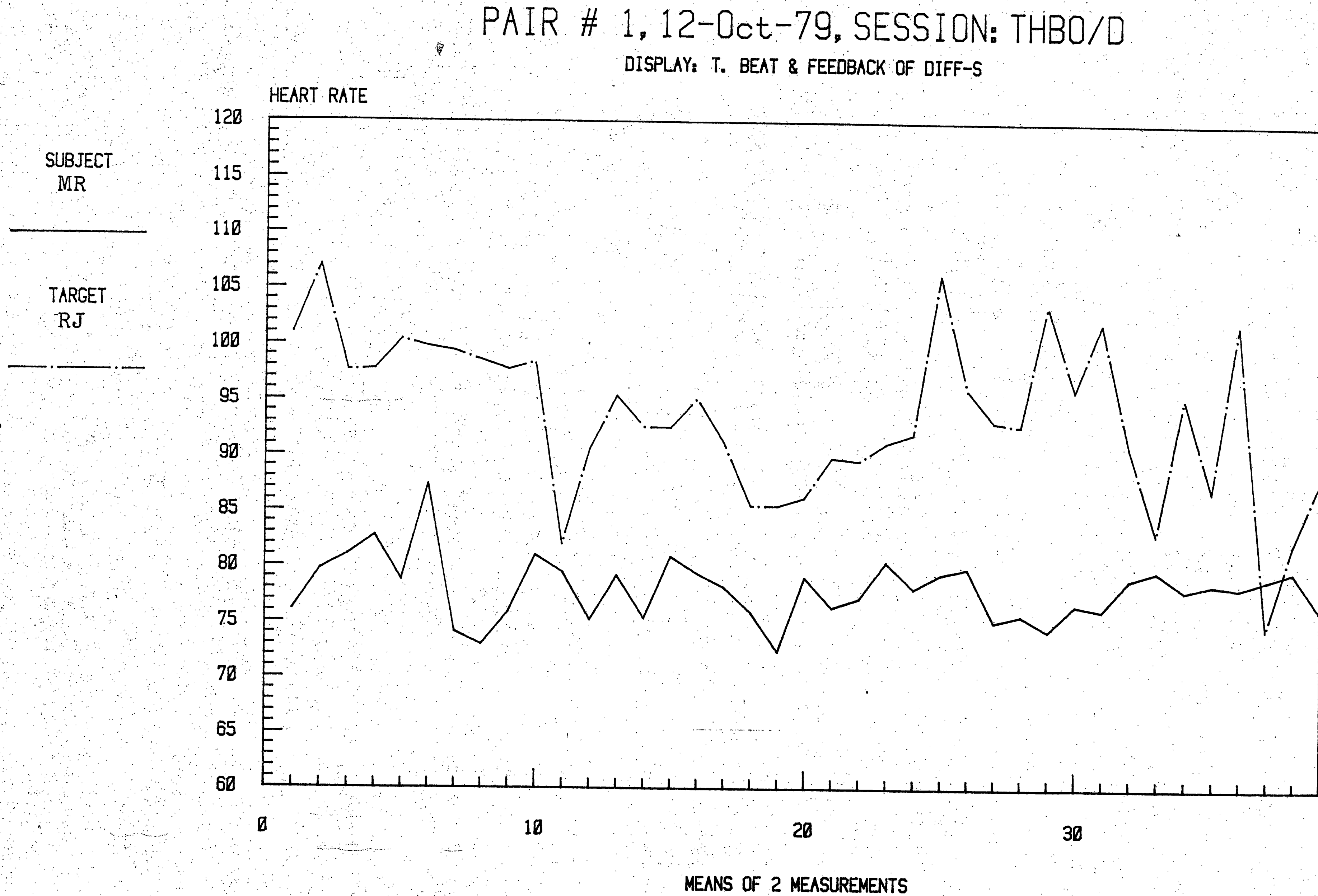
Graph 3

PAIR # 1, 12-Oct-79, SESSION: SHBO/D

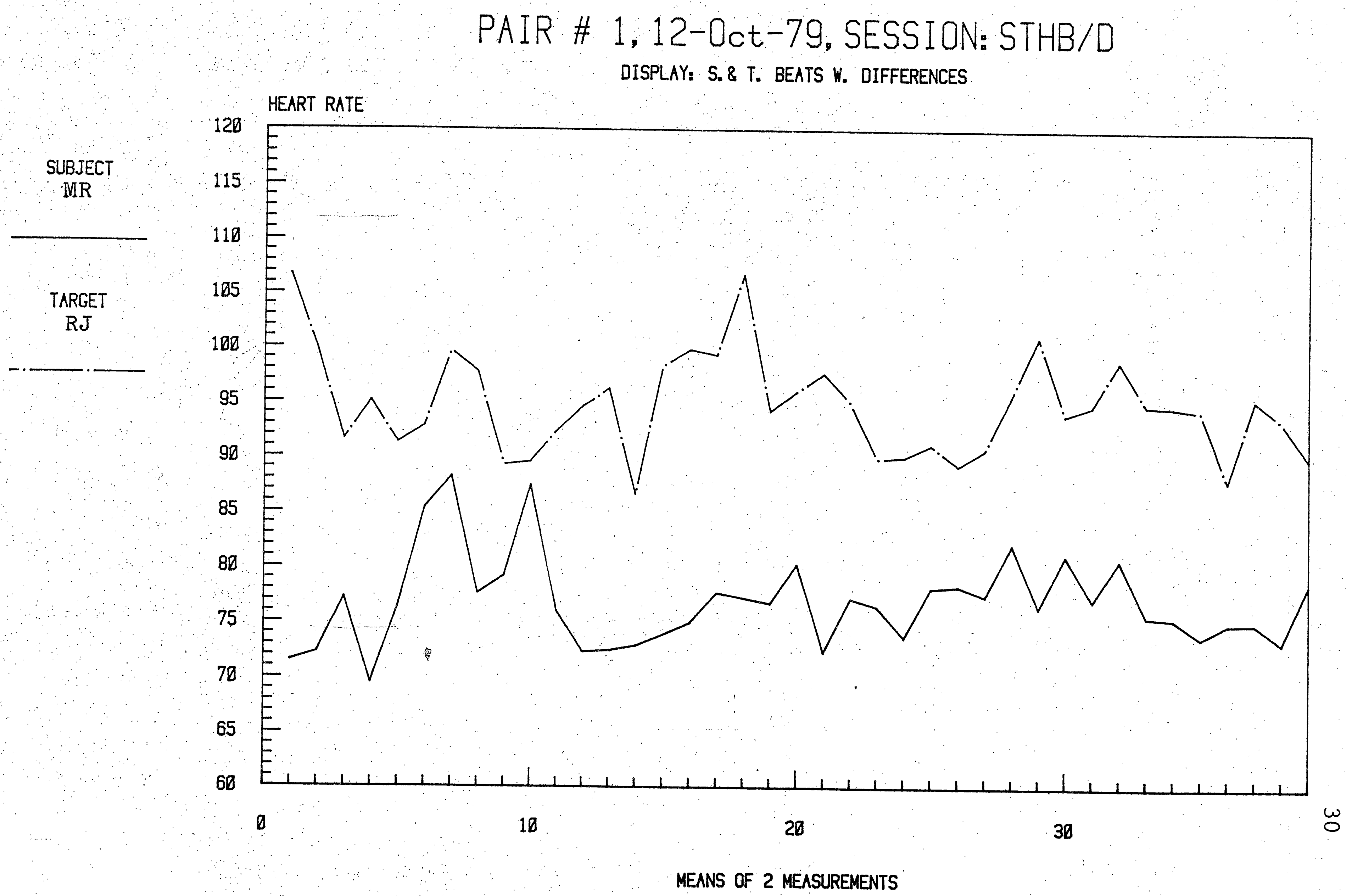
DISPLAY: S. BEAT & FEEDBACK OF DIFF-S



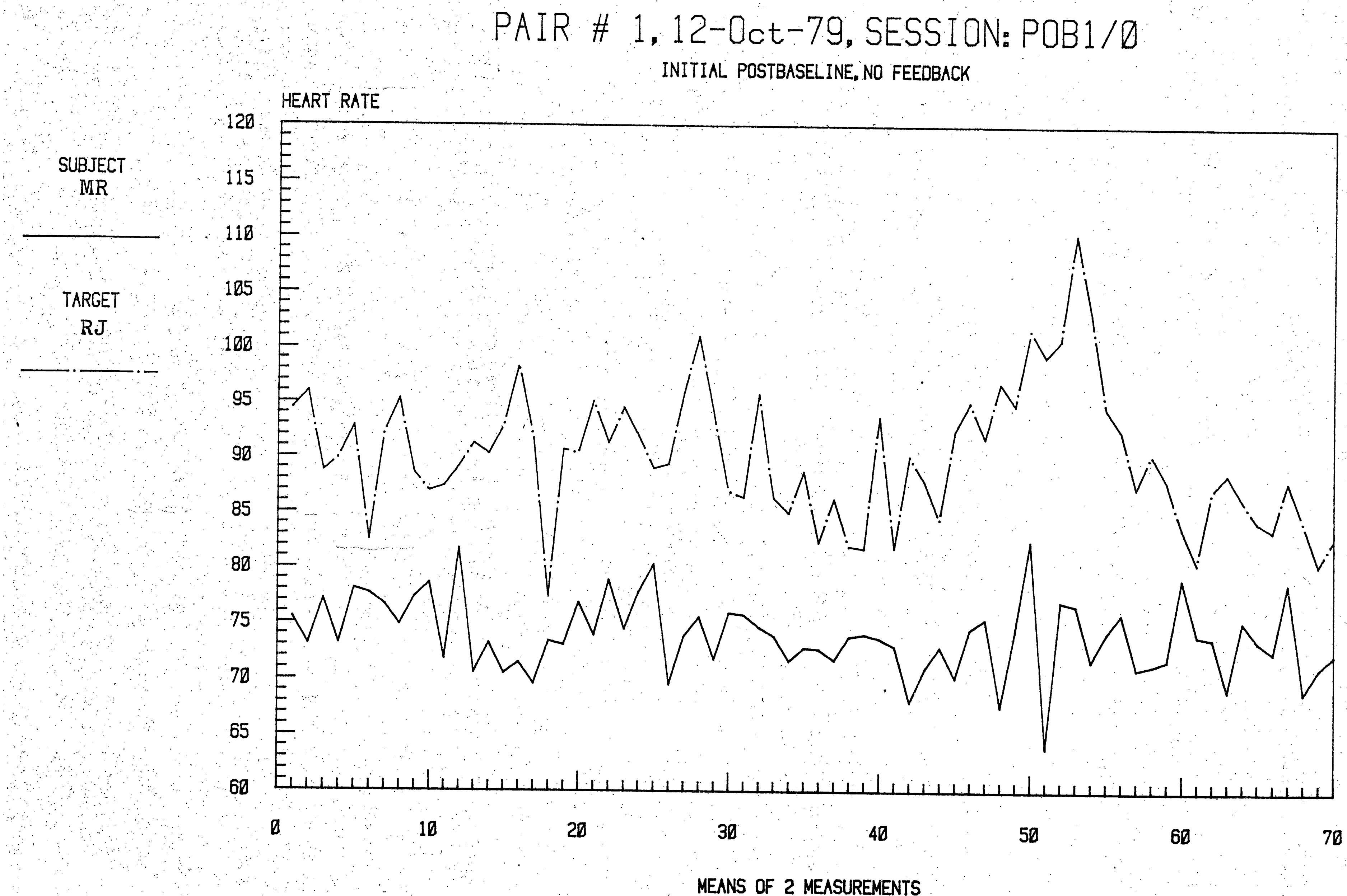
Graph 4


PAIR # 1, 12-Oct-79, SESSION: THBO/D
DISPLAY: T. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
MEANS OF 2 MEASUREMENTS

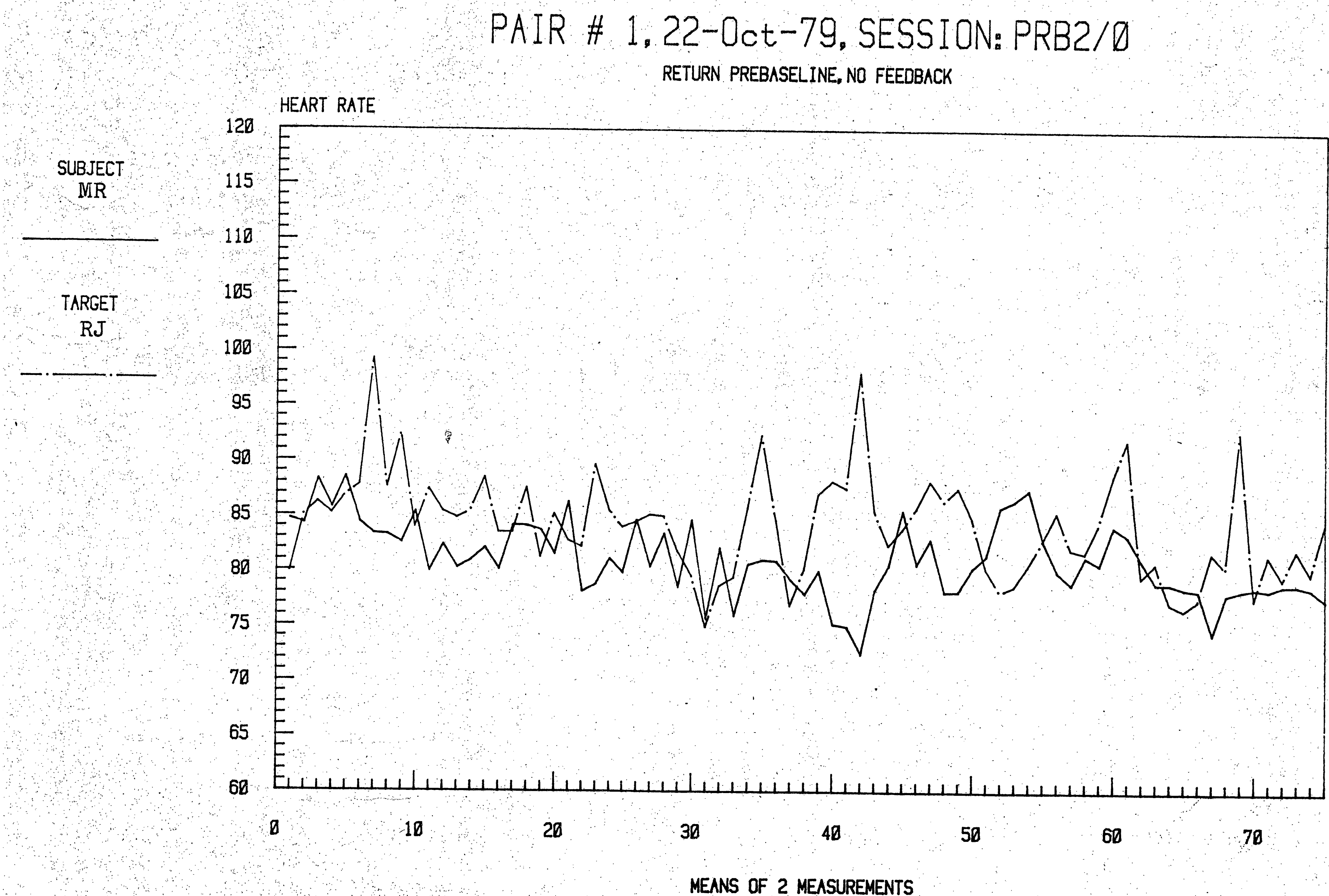
Graph 5


PAIR # 1, 12-Oct-79, SESSION: STHB/D
DISPLAY: S. & T. BEATS W. DIFFERENCES
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
30
MEANS OF 2 MEASUREMENTS

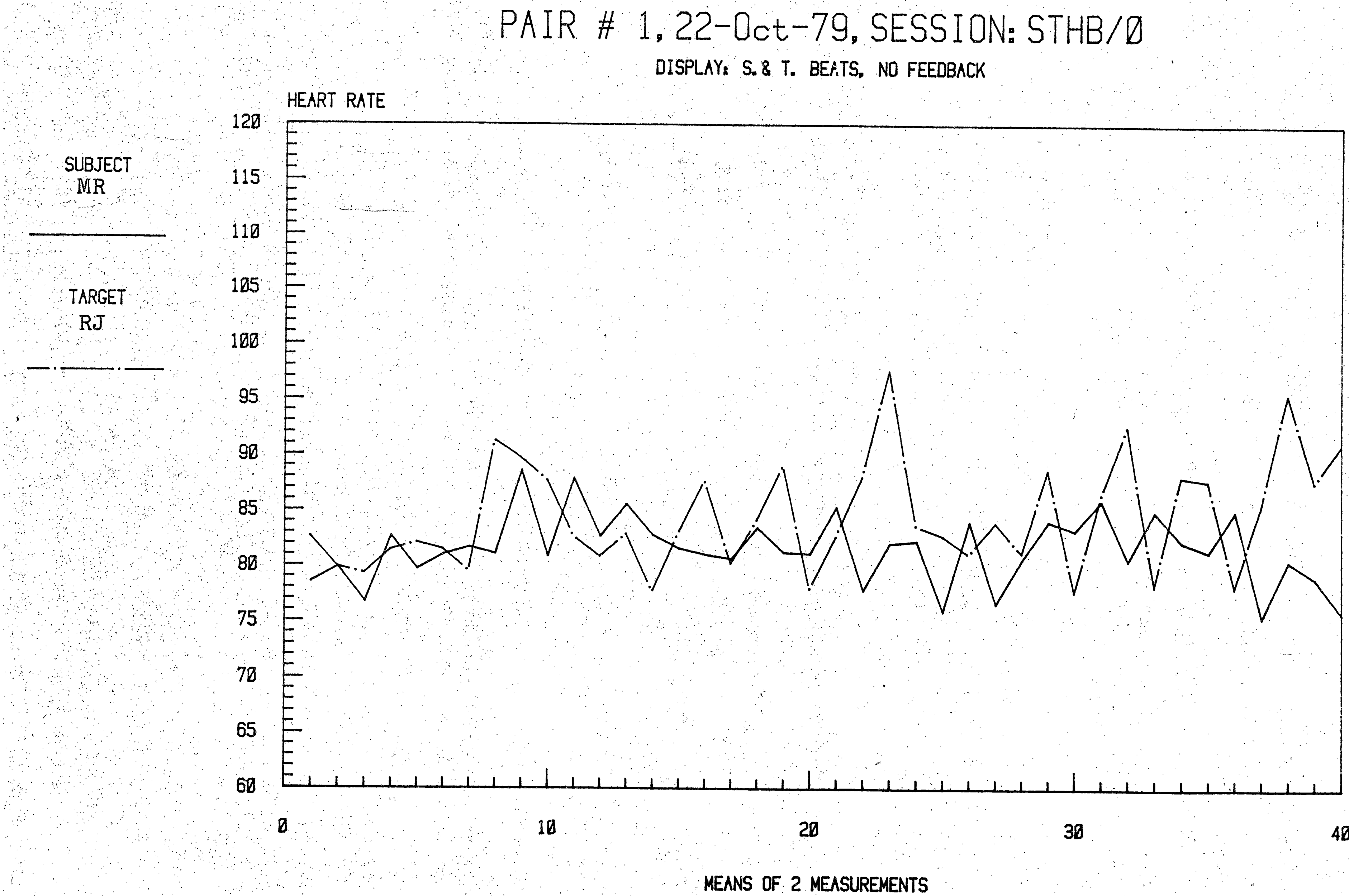
Graph 6


PAIR # 1, 12-Oct-79, SESSION: POB1/0
INITIAL POSTBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

Graph 7


PAIR # 1, 22-Oct-79, SESSION: PRB2/0
RETURN PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

Graph 8

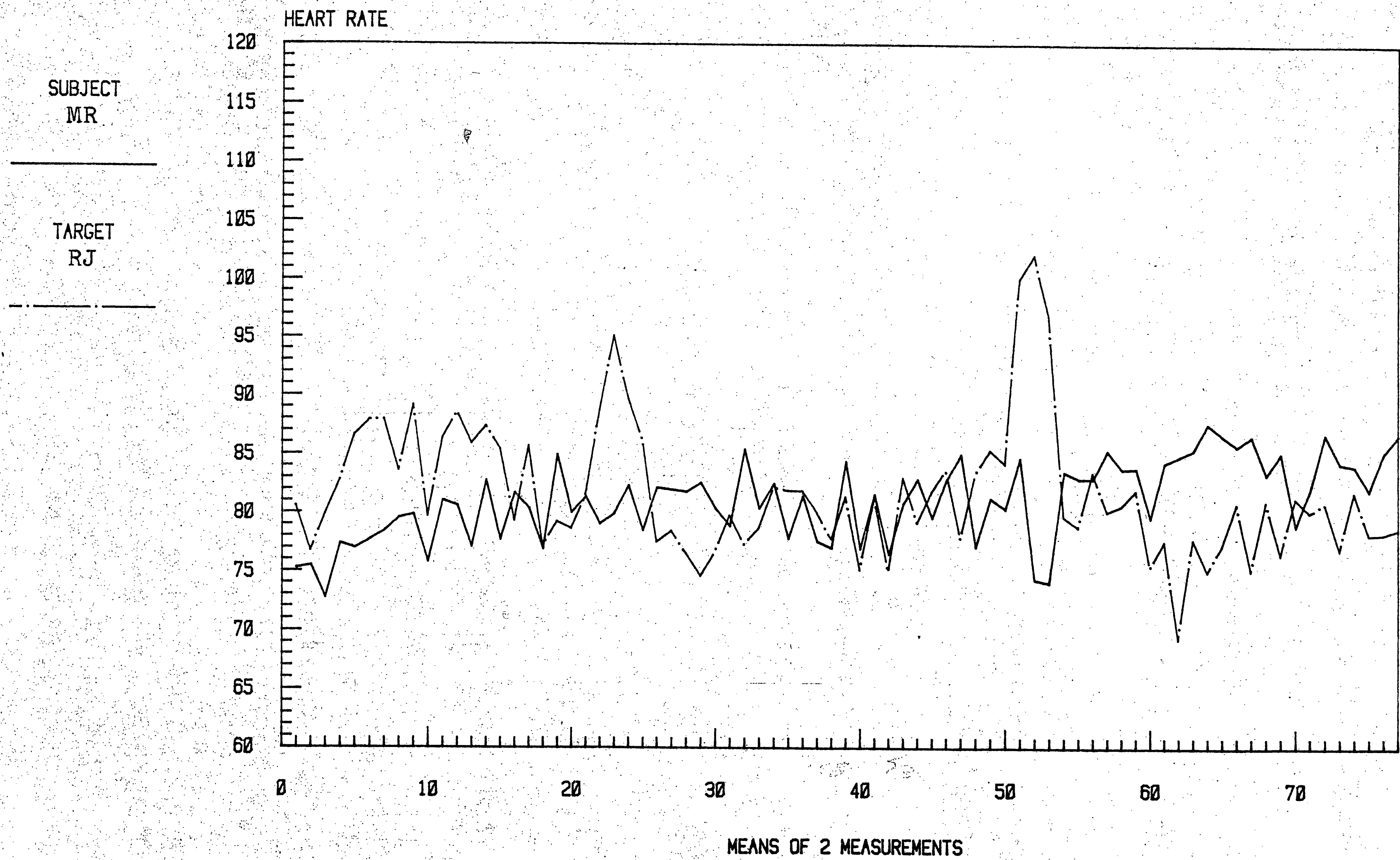


PAIR # 1, 22-Oct-79, SESSION: STHB/0
DISPLAY: S. & T. BEATS, NO FEEDBACK
HEART RATE
SUBJECT
MR
TARGET
RJ
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
MEANS OF 2 MEASUREMENTS

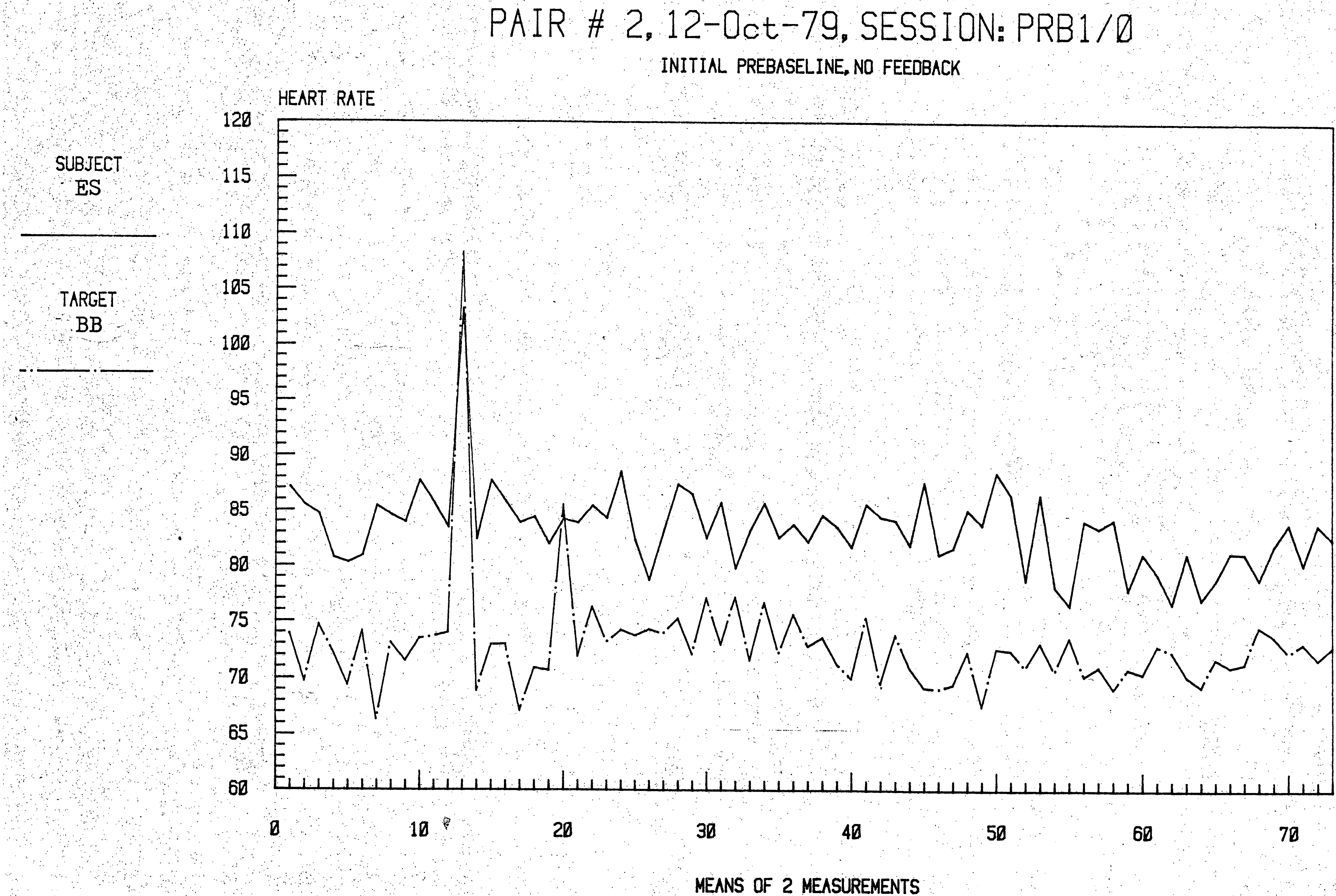
Graph 9

PAIR # 1, 22-Oct-79, SESSION: POB2/Ø

RETURN POSTBASELINE, NO FEEDBACK



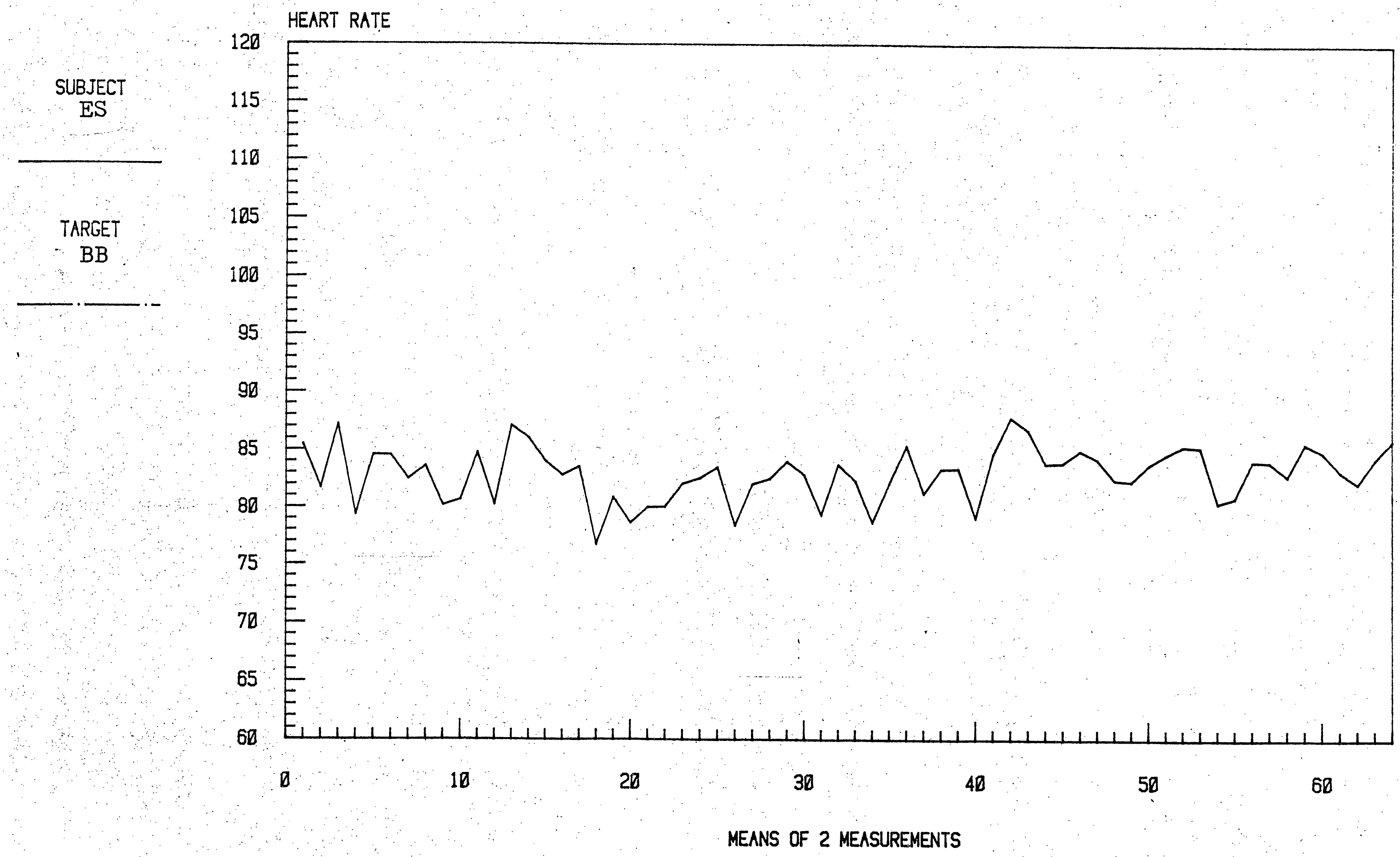
Graph 10


PAIR # 2, 12-Oct-79, SESSION: PRB1/Ø
INITIAL PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
Ø
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

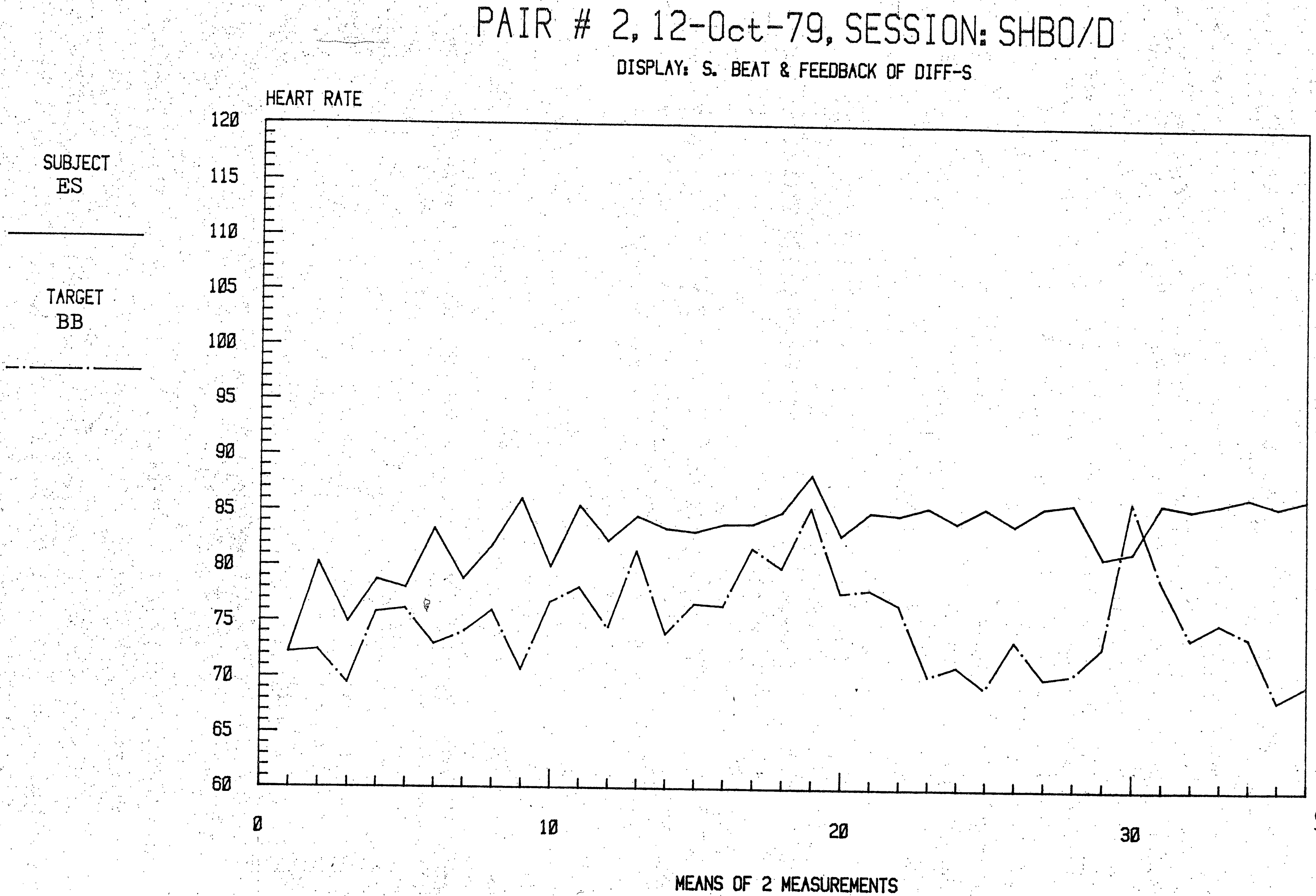
Graph 11

PAIR # 2, 12-Oct-79, SESSION: SHBO/C

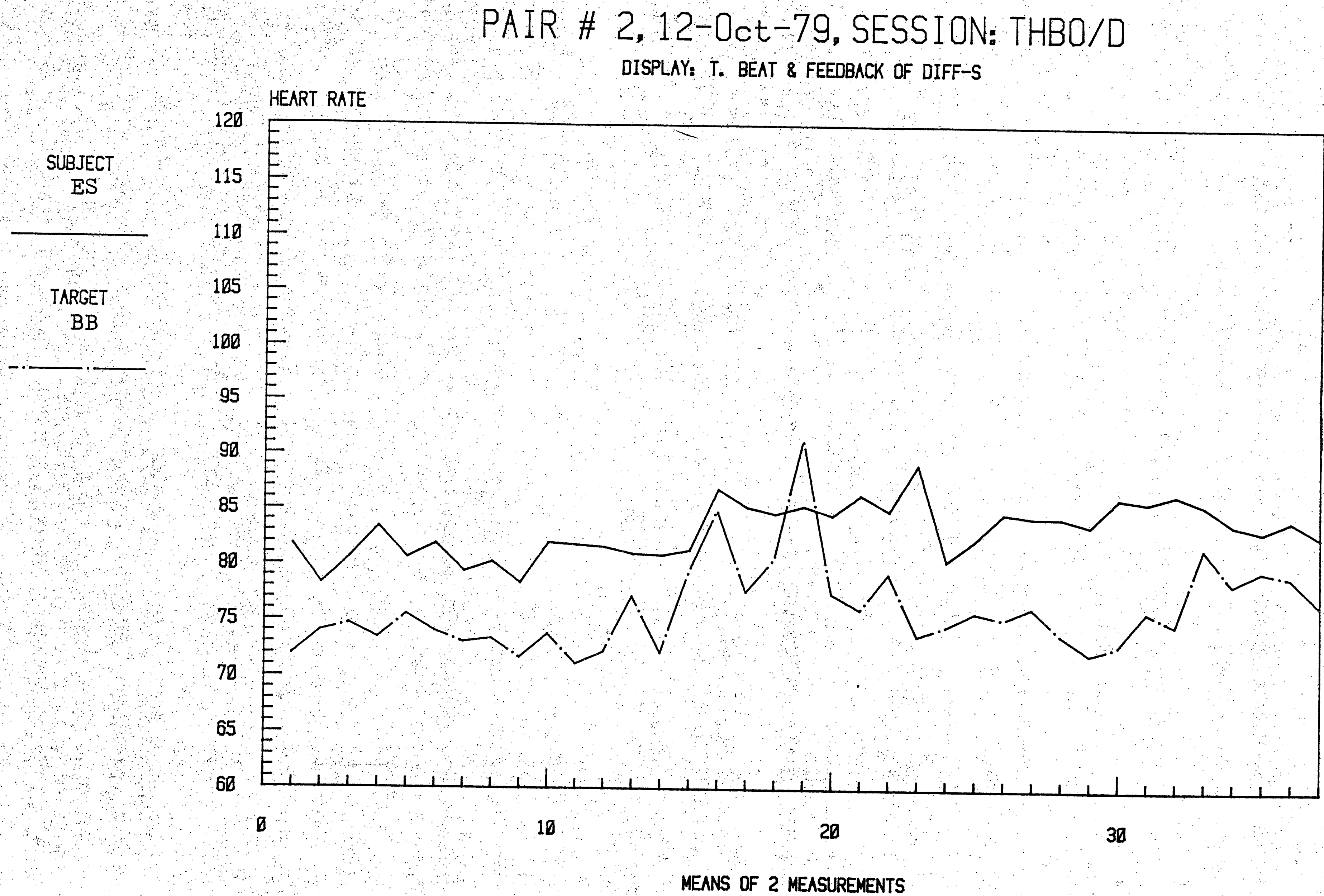
DISPLAY: S. BEAT & FEEDBACK OF CHANGE



Graph 12

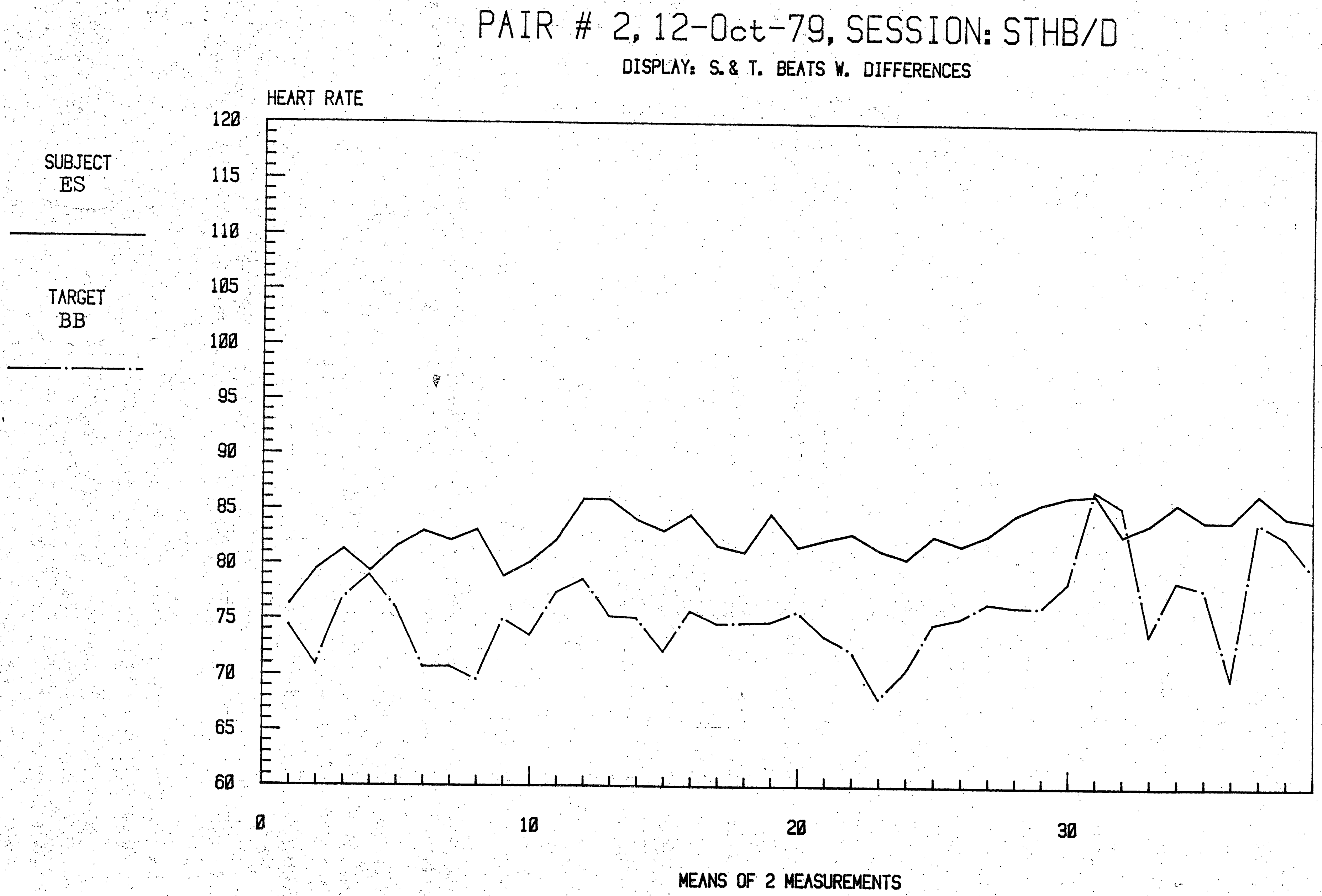

PAIR # 2, 12-Oct-79, SESSION: SHBO/D
DISPLAY: S. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 13

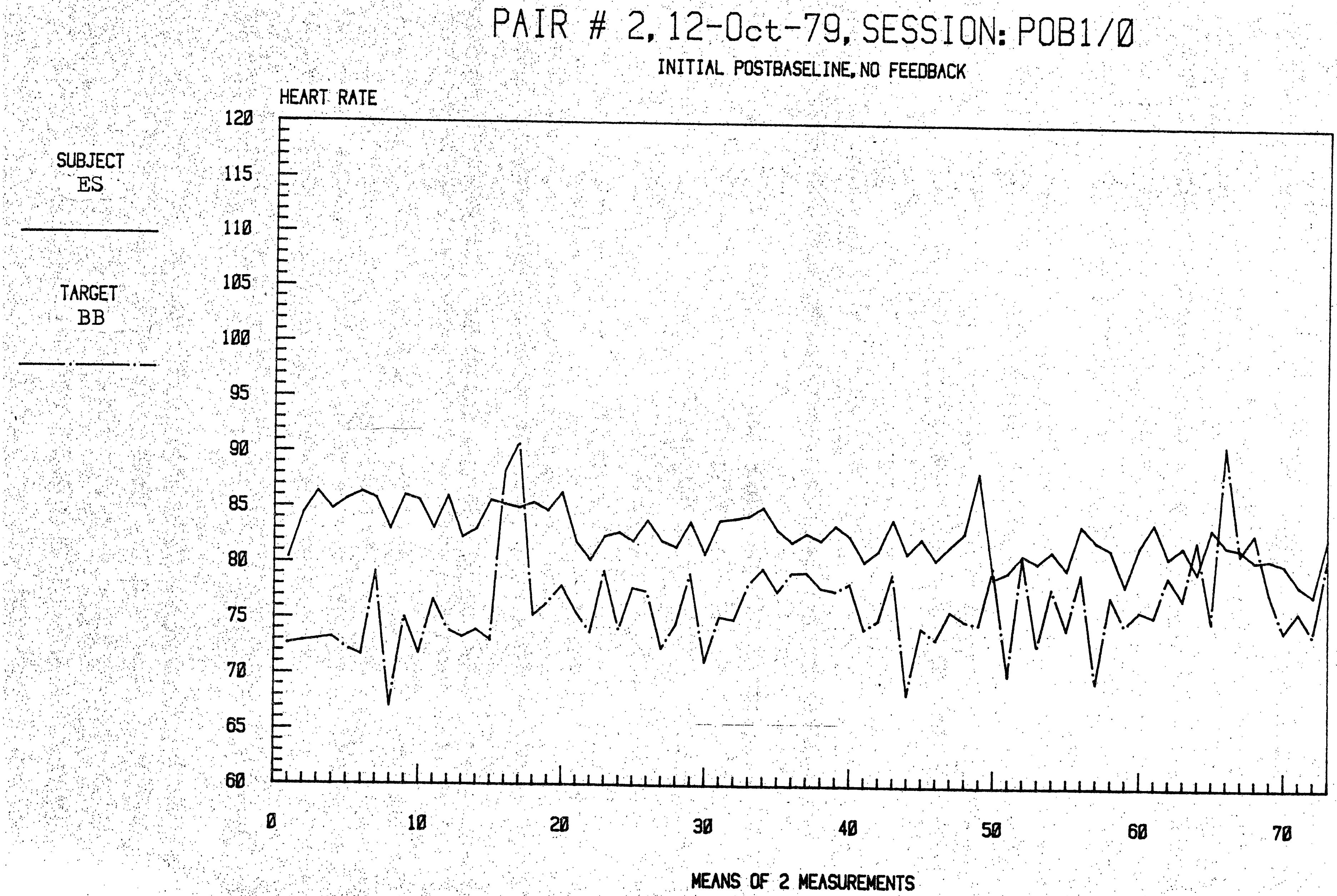


PAIR # 2, 12-Oct-79, SESSION: THBO/D
DISPLAY: T. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 14

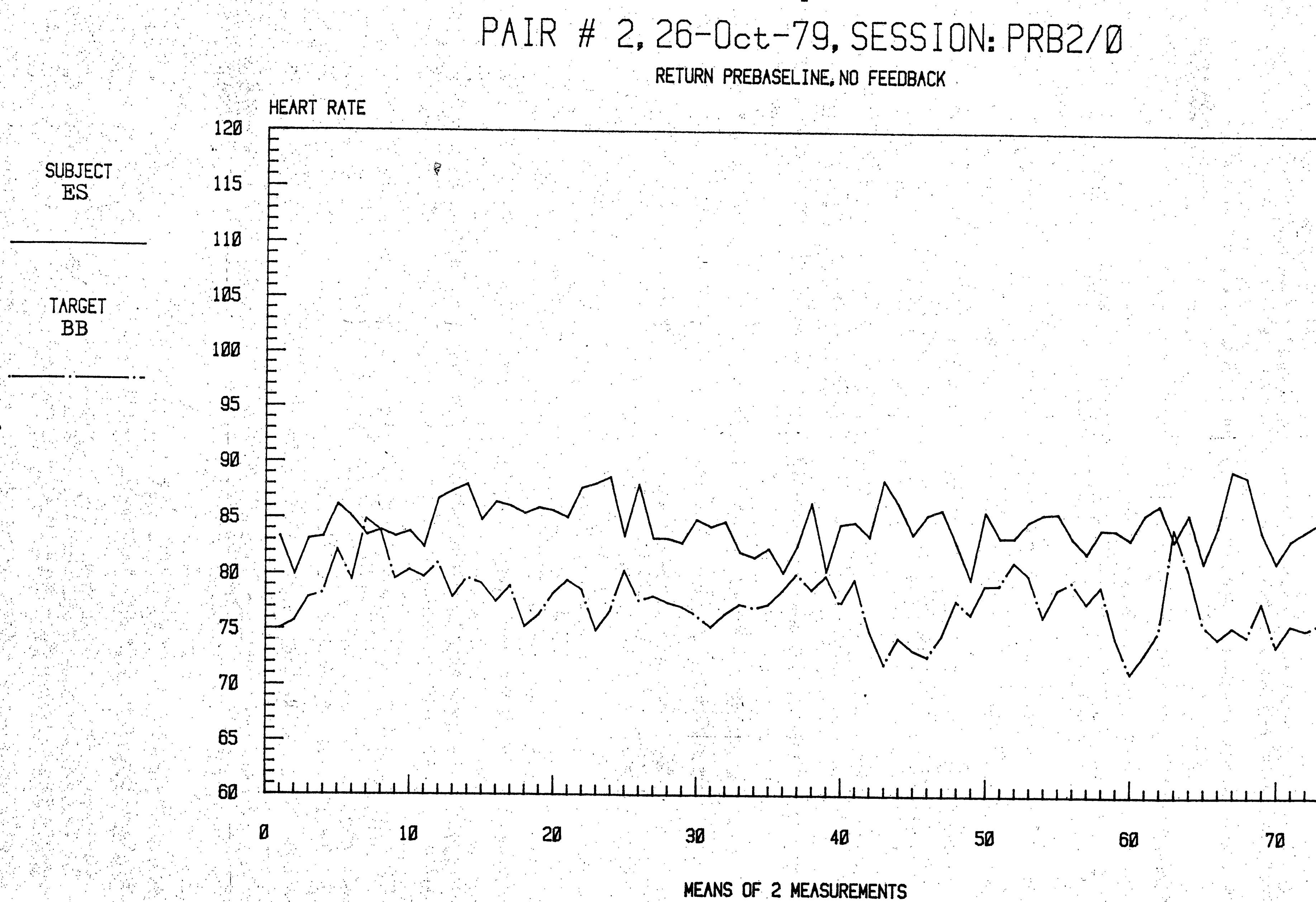

PAIR # 2, 12-Oct-79, SESSION: STHB/D
DISPLAY: S. & T. BEATS W. DIFFERENCES
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 15

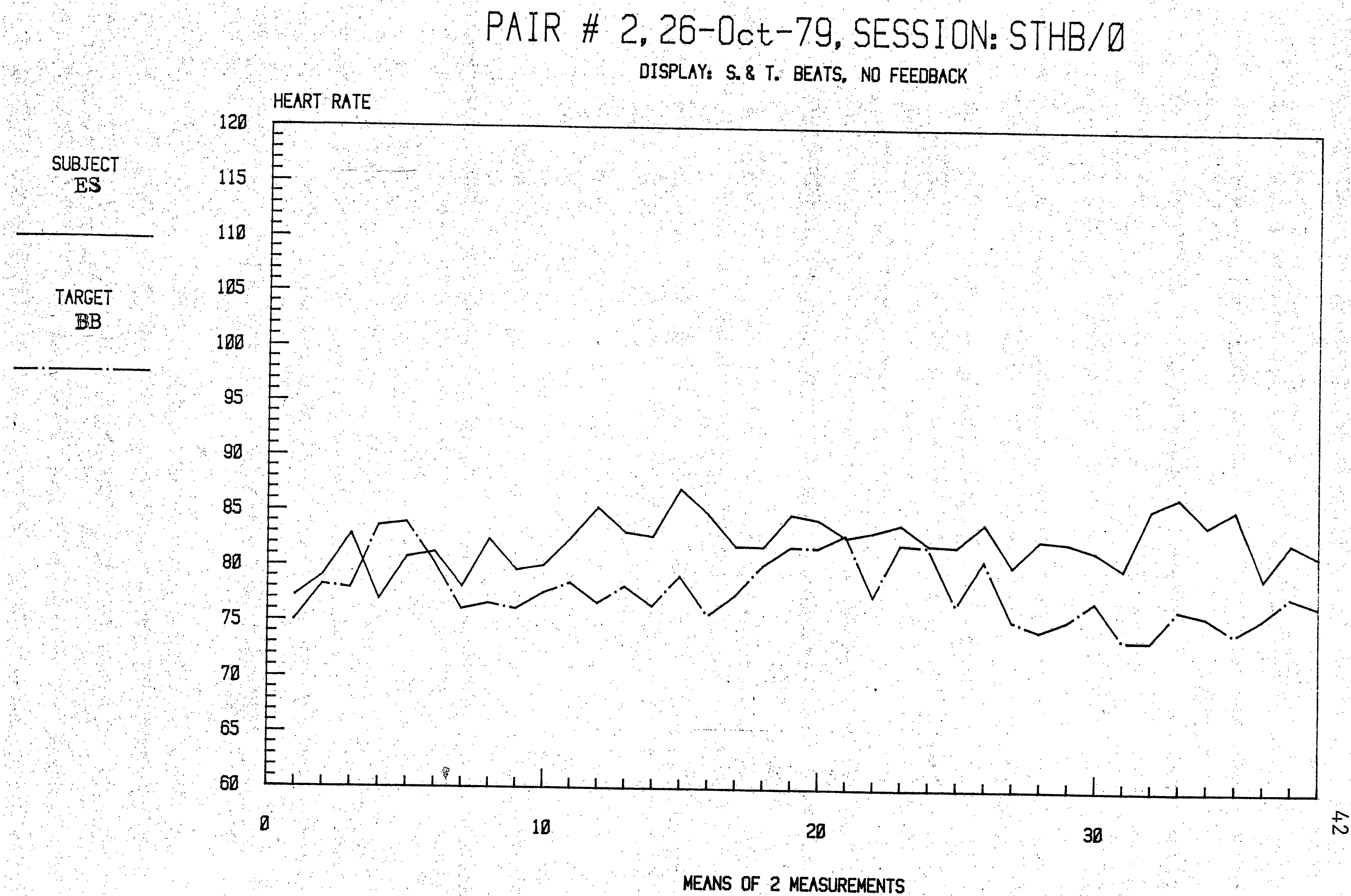


PAIR # 2, 12-Oct-79, SESSION: POB1/0
INITIAL POSTBASELINE, NO FEEDBACK
HEART RATE
120
115
110
105
100
95
90
85
80
75
70
65
60
SUBJECT
ES
TARGET
BB
0
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

Graph 16


PAIR # 2, 26-Oct-79, SESSION: PRB2/Ø
RETURN PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
Ø
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

Graph 17



PAIR # 2, 26-Oct-79, SESSION: STHB/Ø
DISPLAY: S. & T. BEATS, NO FEEDBACK
HEART RATE
SUBJECT
ES
TARGET
BB
120
115
110
105
100
95
90
85
80
75
70
65
60
Ø
10
20
30
42
MEANS OF 2 MEASUREMENTS

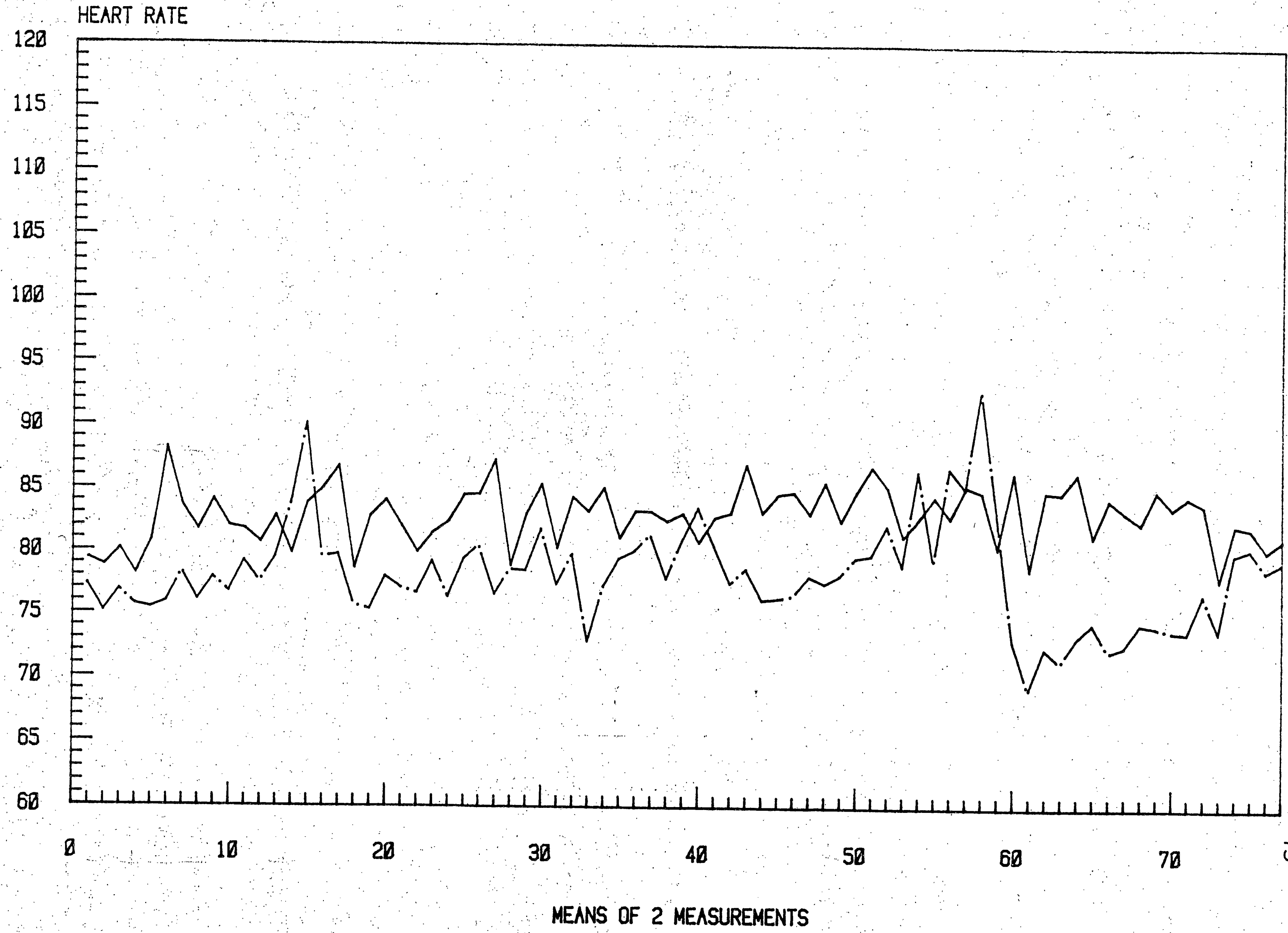
Graph 18

PAIR # 2, 26-Oct-79, SESSION: POB2/Ø

RETURN POSTBASELINE, NO FEEDBACK

SUBJECT ES ————

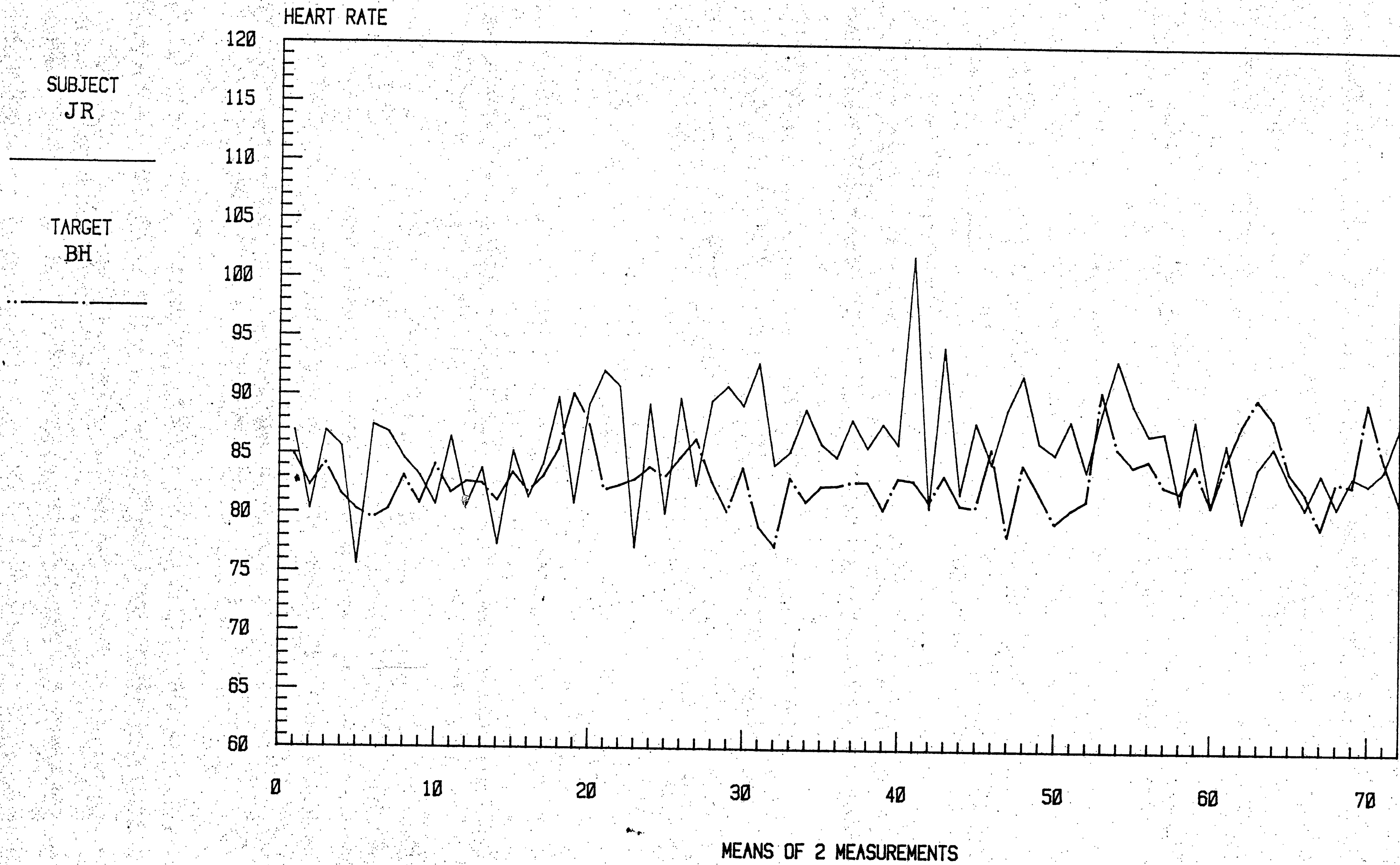
TARGET BB —·—·—



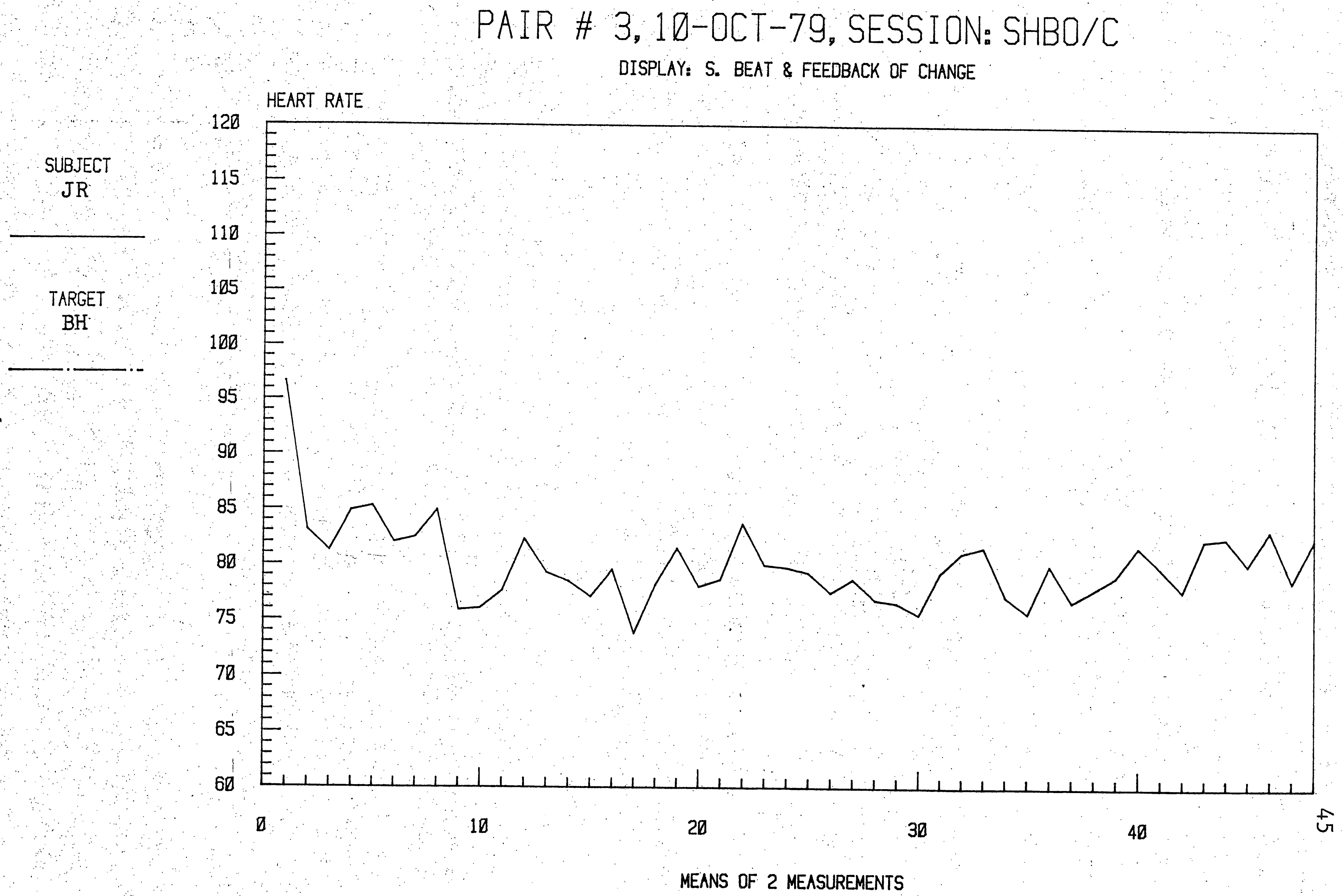
Graph 19

PAIR # 3, 1Ø-OCT-79, SESSION: PRB1/Ø

INITIAL PREBASELINE, NO FEEDBACK



Graph 20

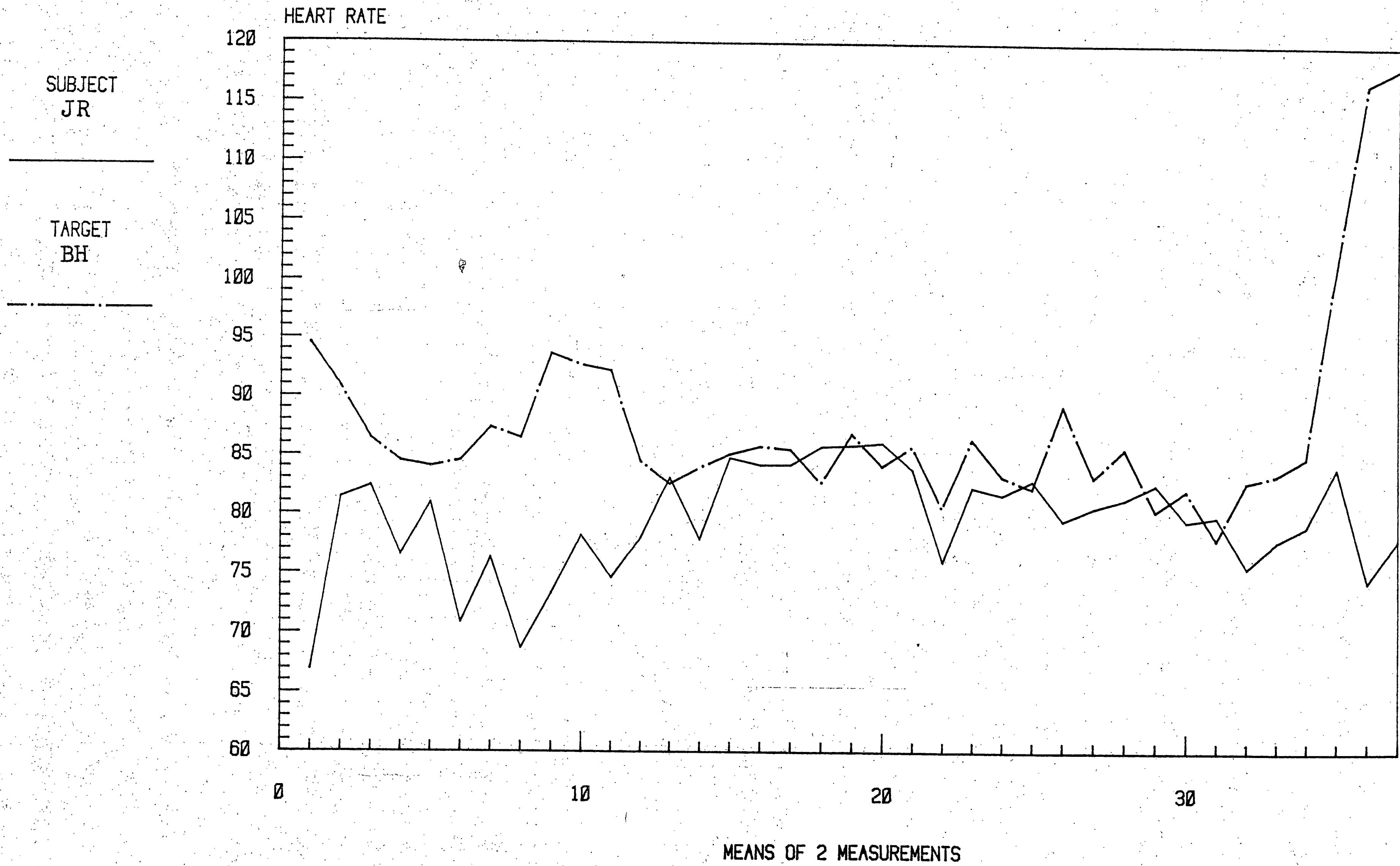


PAIR # 3, 10-OCT-79, SESSION: SHBO/C
DISPLAY: S. BEAT & FEEDBACK OF CHANGE
HEART RATE
SUBJECT
JR
TARGET
BH
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
45
MEANS OF 2 MEASUREMENTS

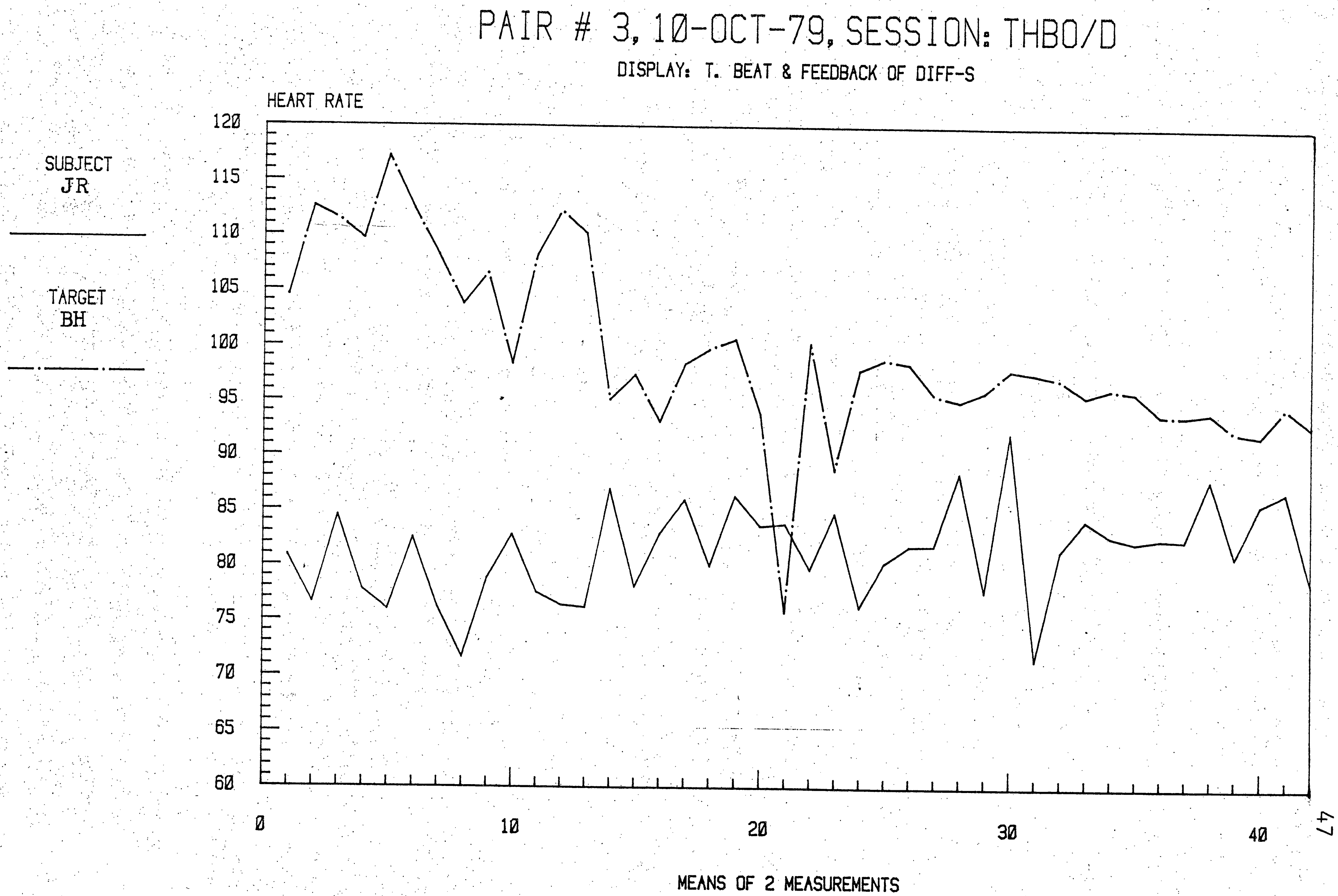
Graph 21

PAIR # 3, 1Ø-OCT-79, SESSION: SHBO/D

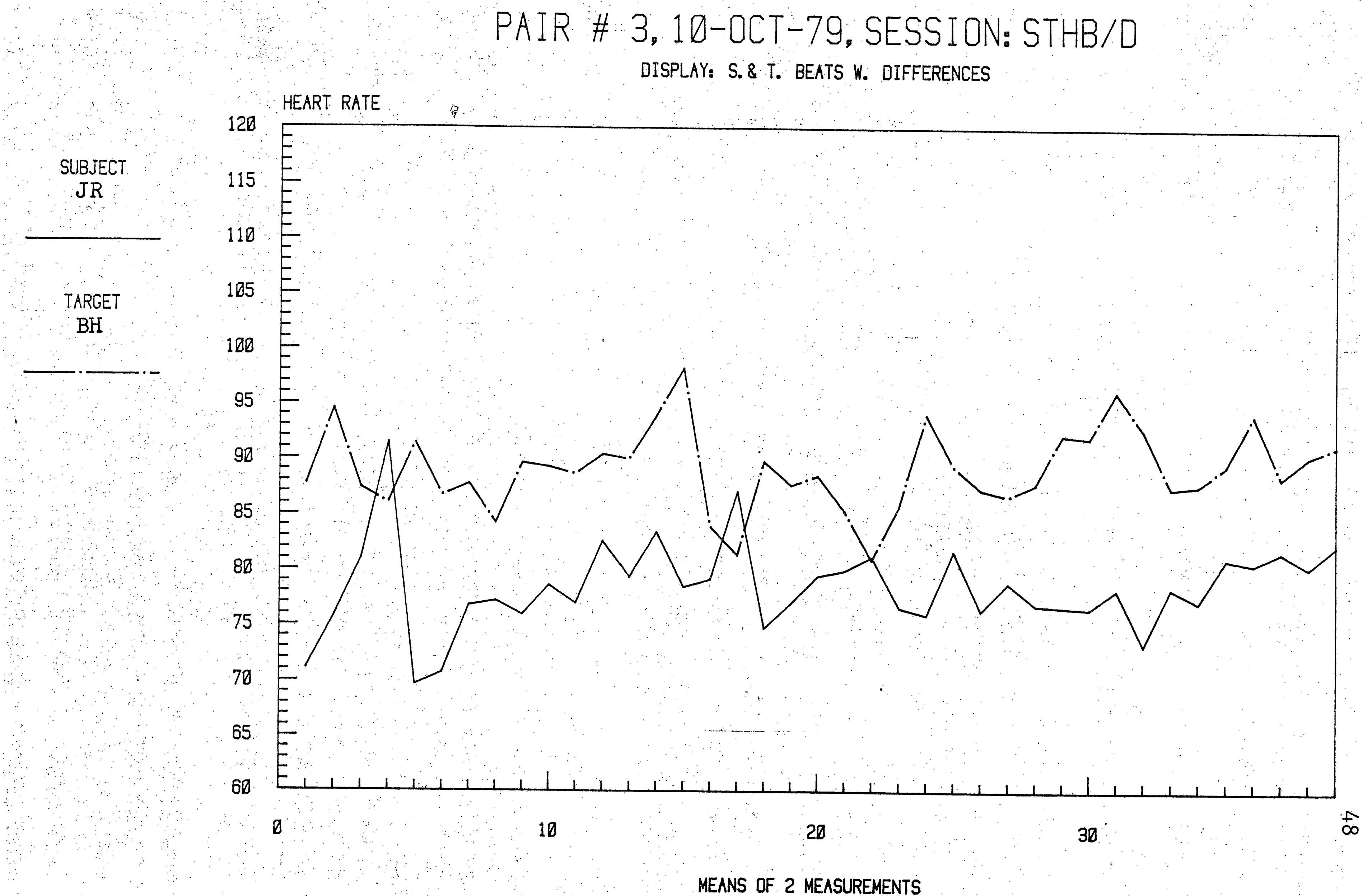
DISPLAY: S. BEAT & FEEDBACK OF DIFF-S



Graph 22

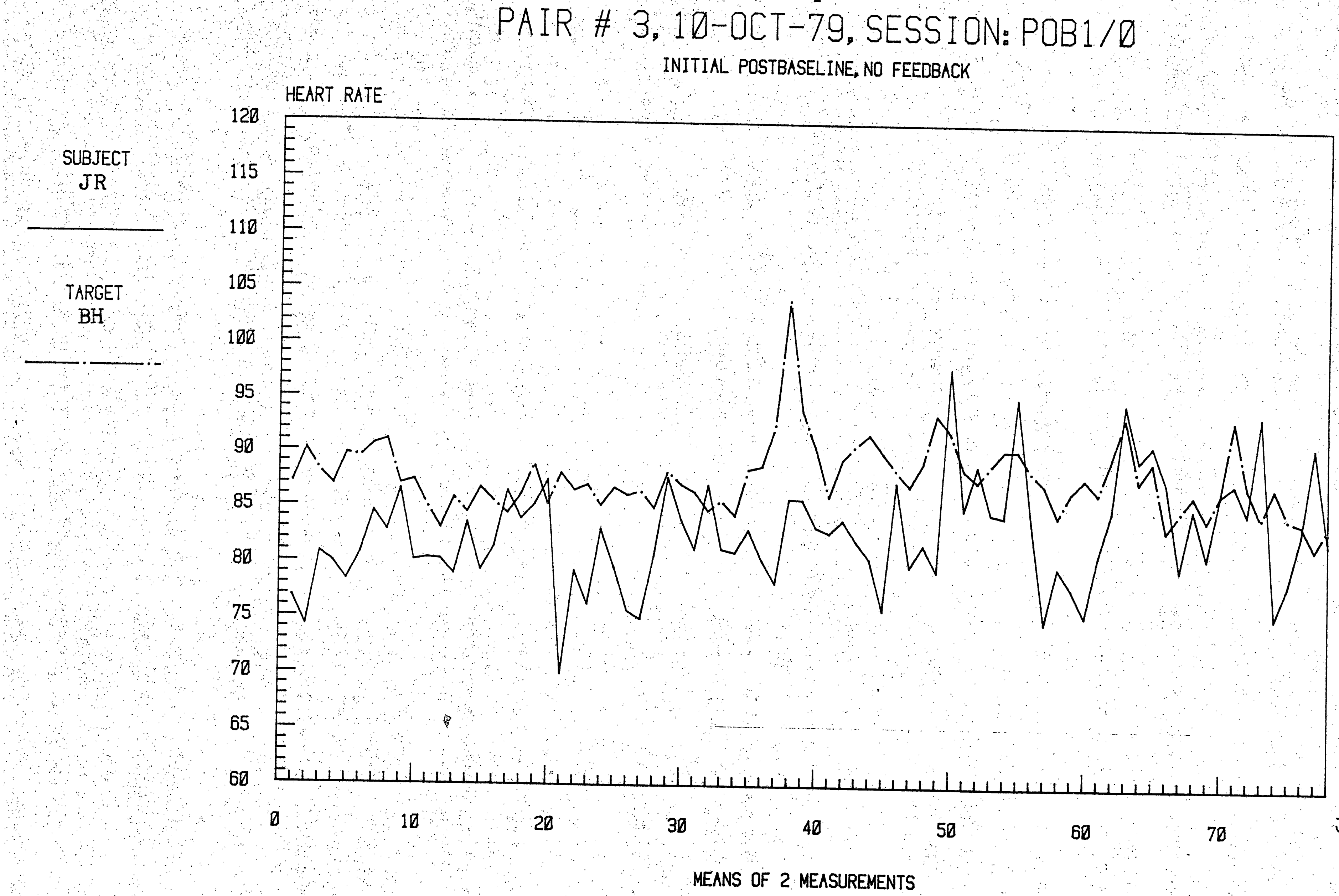

PAIR # 3, 10-OCT-79, SESSION: THBO/D
DISPLAY: T. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
JR
TARGET
BH
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
40
MEANS OF 2 MEASUREMENTS

Graph 23

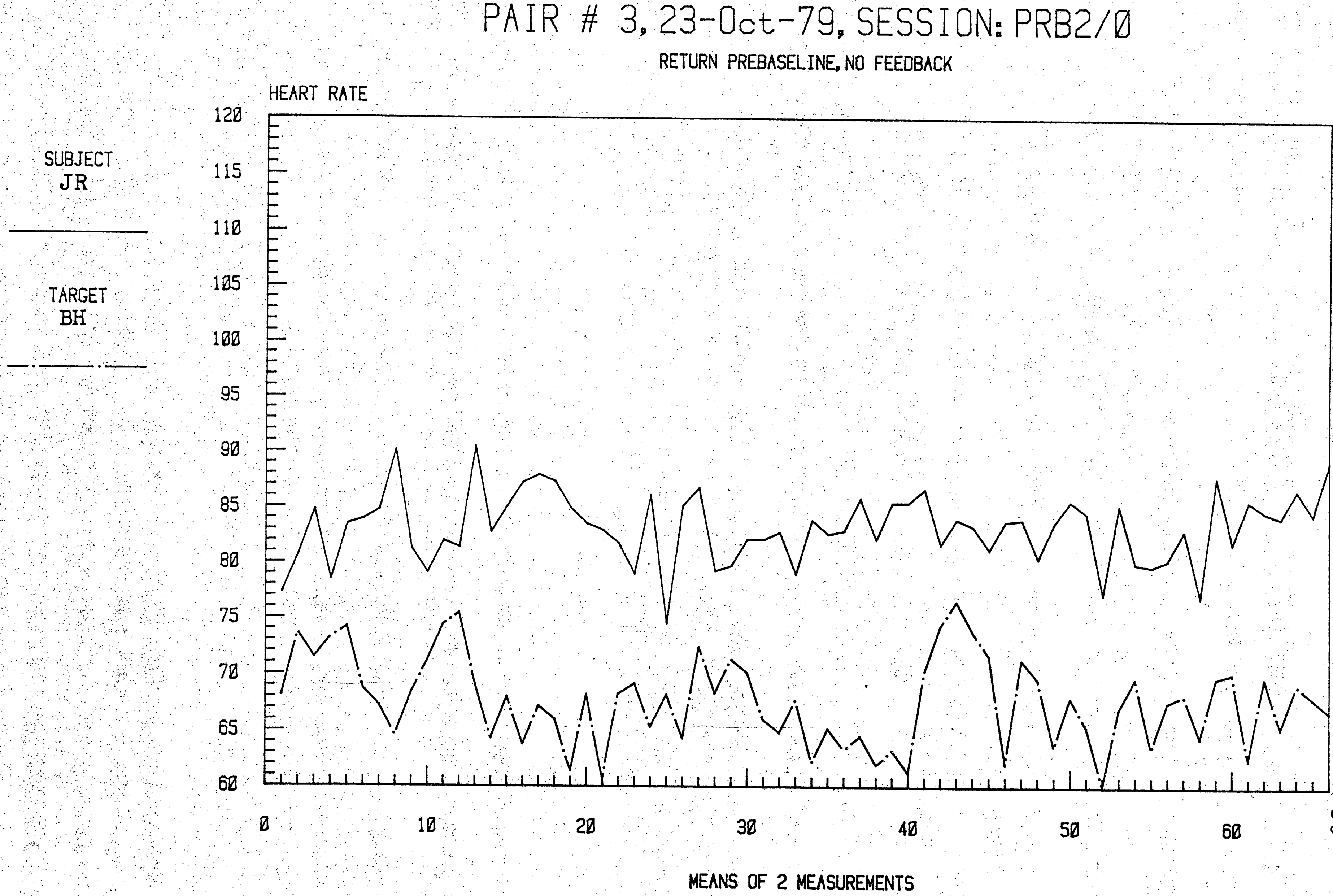


PAIR # 3, 10-OCT-79, SESSION: STHB/D
DISPLAY: S. & T. BEATS W. DIFFERENCES
HEART RATE
SUBJECT
JR
TARGET
BH
120
115
110
105
100
95
90
85
80
75
70
65
60
0
10
20
30
MEANS OF 2 MEASUREMENTS

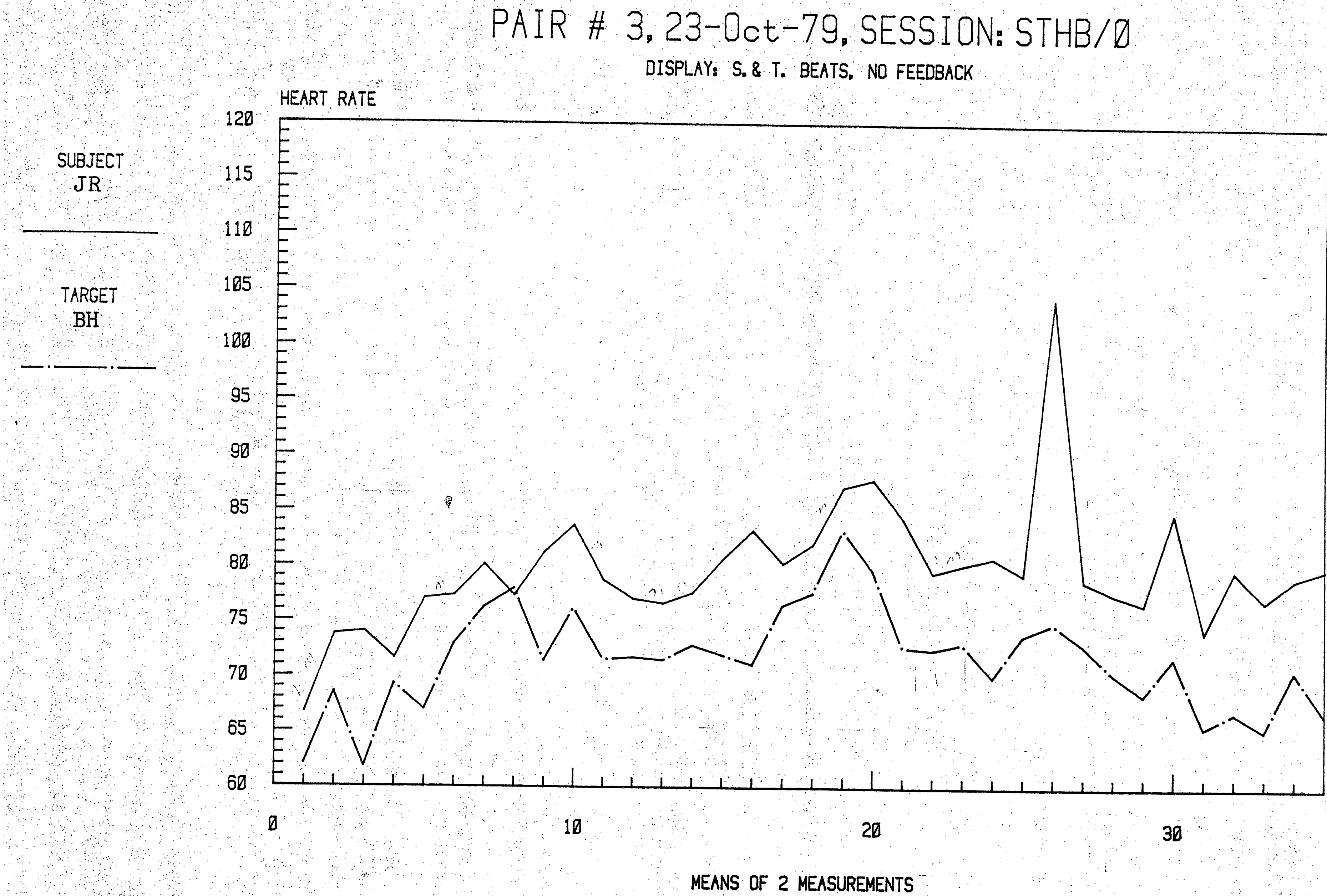
Graph 24


PAIR # 3, 10-OCT-79, SESSION: POB1/0
INITIAL POSTBASELINE, NO FEEDBACK
HEART RATE
120
115
110
105
100
95
90
85
80
75
70
65
60
SUBJECT
JR
TARGET
BH
0
10
20
30
40
50
60
70
MEANS OF 2 MEASUREMENTS

Graph 25


PAIR # 3, 23-Oct-79, SESSION: PRB2/Ø
RETURN PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
JR
TARGET
BH
120
115
110
105
100
95
90
85
80
75
70
65
60
Ø
10
20
30
40
50
60
MEANS OF 2 MEASUREMENTS

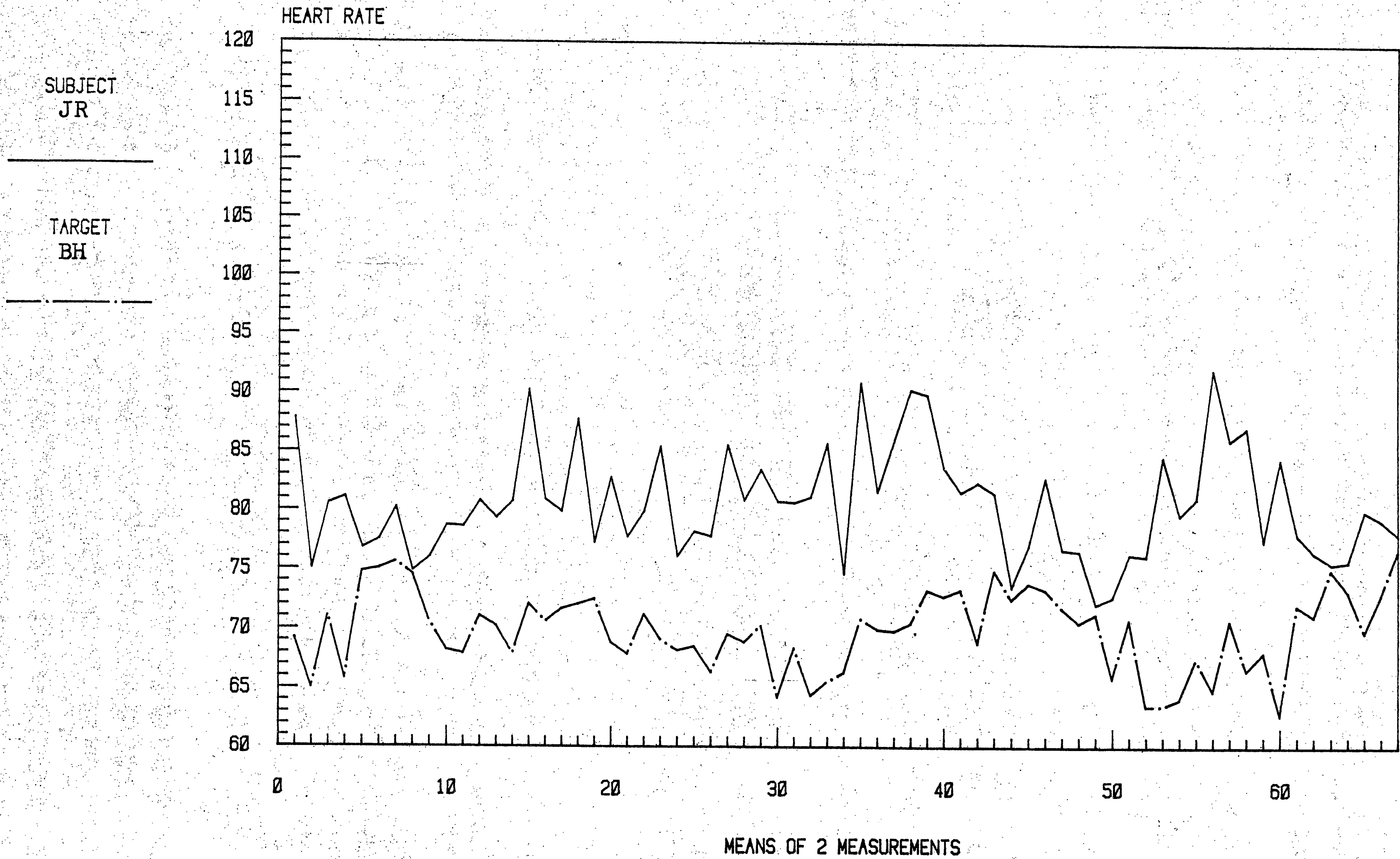
Graph 26


PAIR # 3, 23-Oct-79, SESSION: STHB/Ø
DISPLAY: S. & T. BEATS, NO FEEDBACK
HEART RATE
SUBJECT
JR
TARGET
BH
12Ø
115
11Ø
1Ø5
1ØØ
95
9Ø
85
8Ø
75
7Ø
65
6Ø
Ø
1Ø
2Ø
3Ø
MEANS OF 2 MEASUREMENTS

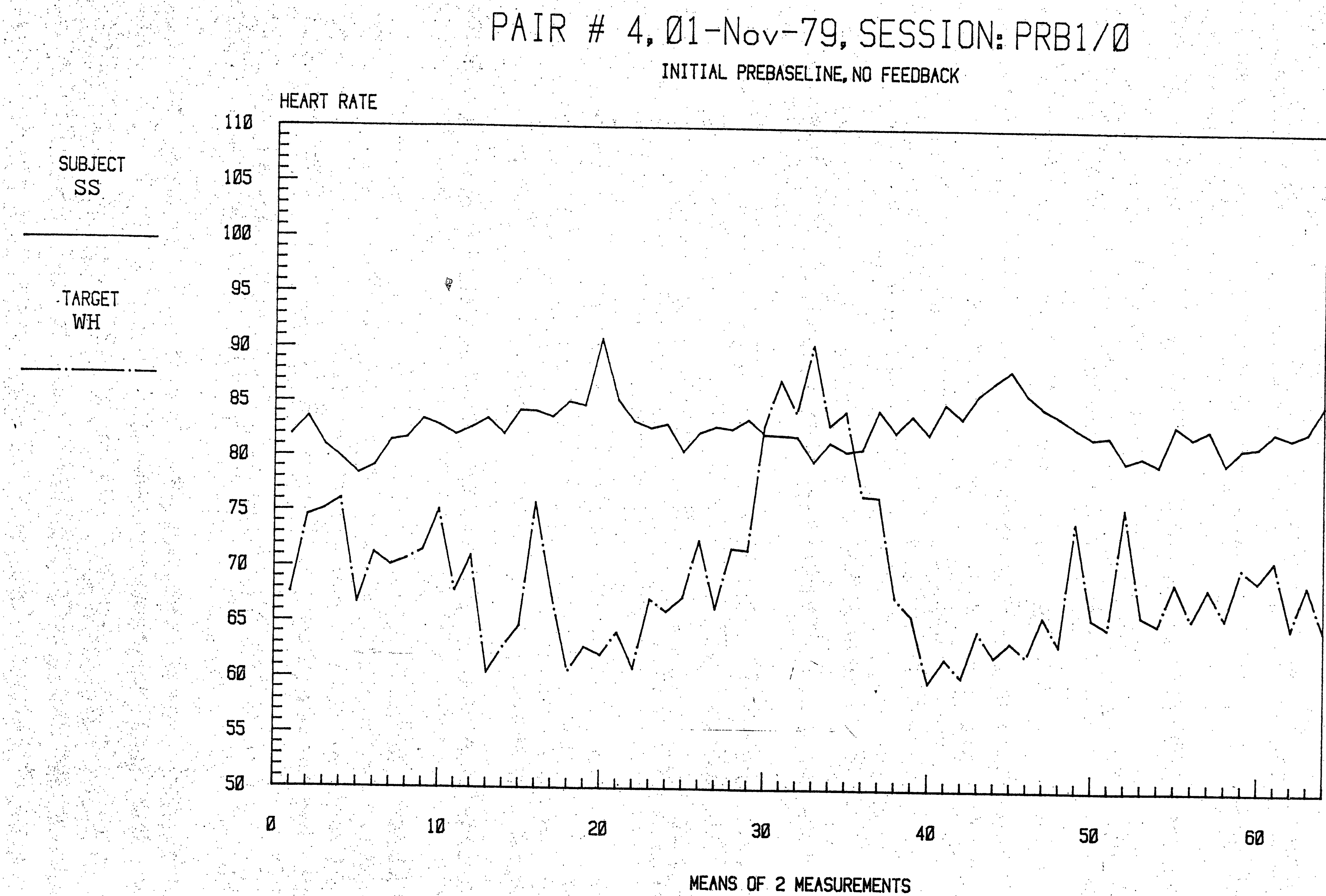
Graph 27

PAIR # 3, 23-Oct-79, SESSION: POB2/0

RETURN POSTBASELINE, NO FEEDBACK

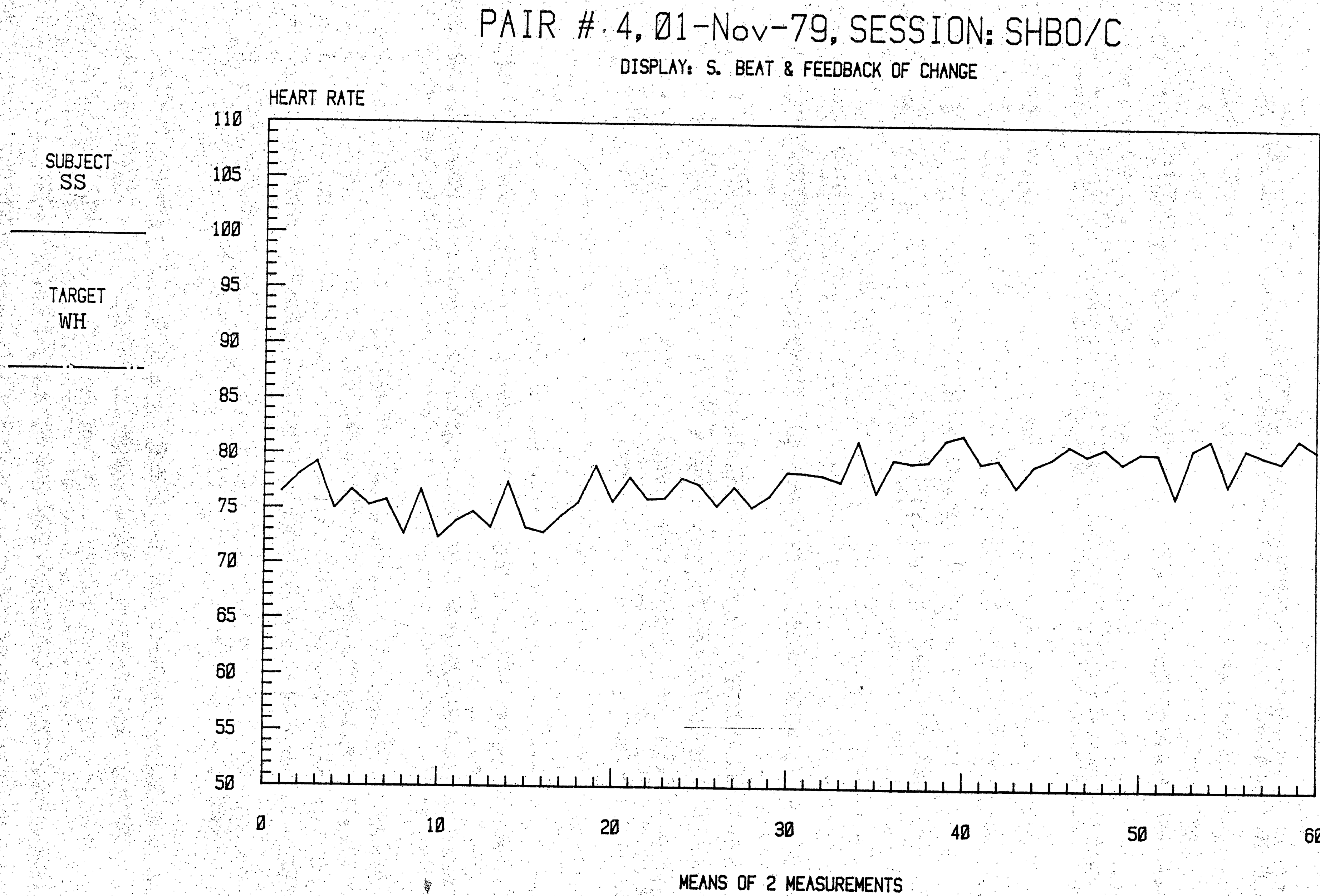


Graph 28



PAIR # 4, 01-Nov-79, SESSION: PRB1/0
INITIAL PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
40
50
60
MEANS OF 2 MEASUREMENTS

Graph 29

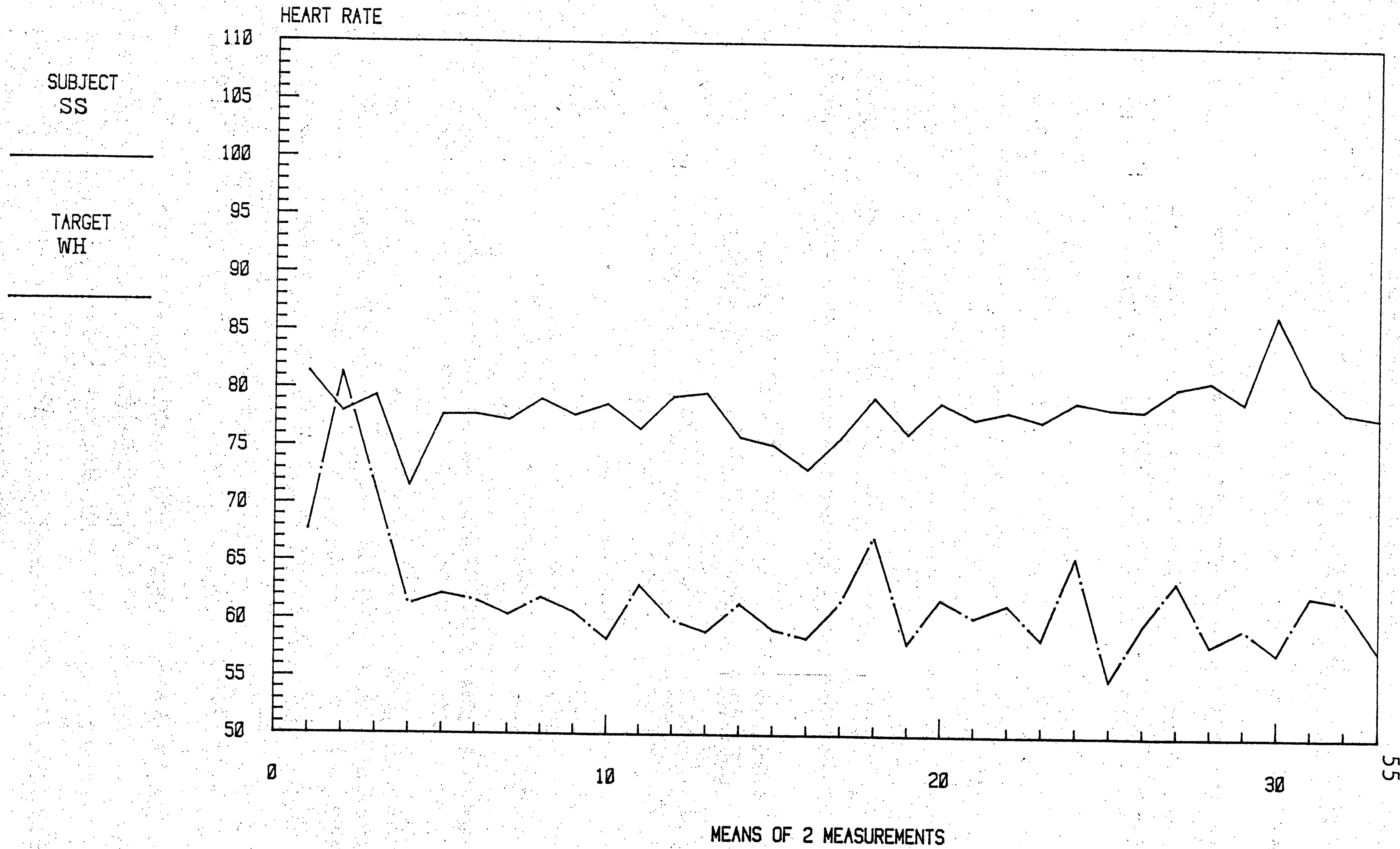


PAIR # 4, Ø1-Nov-79, SESSION: SHBO/C
DISPLAY: S. BEAT & FEEDBACK OF CHANGE
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
Ø
10
20
30
40
50
60
MEANS OF 2 MEASUREMENTS

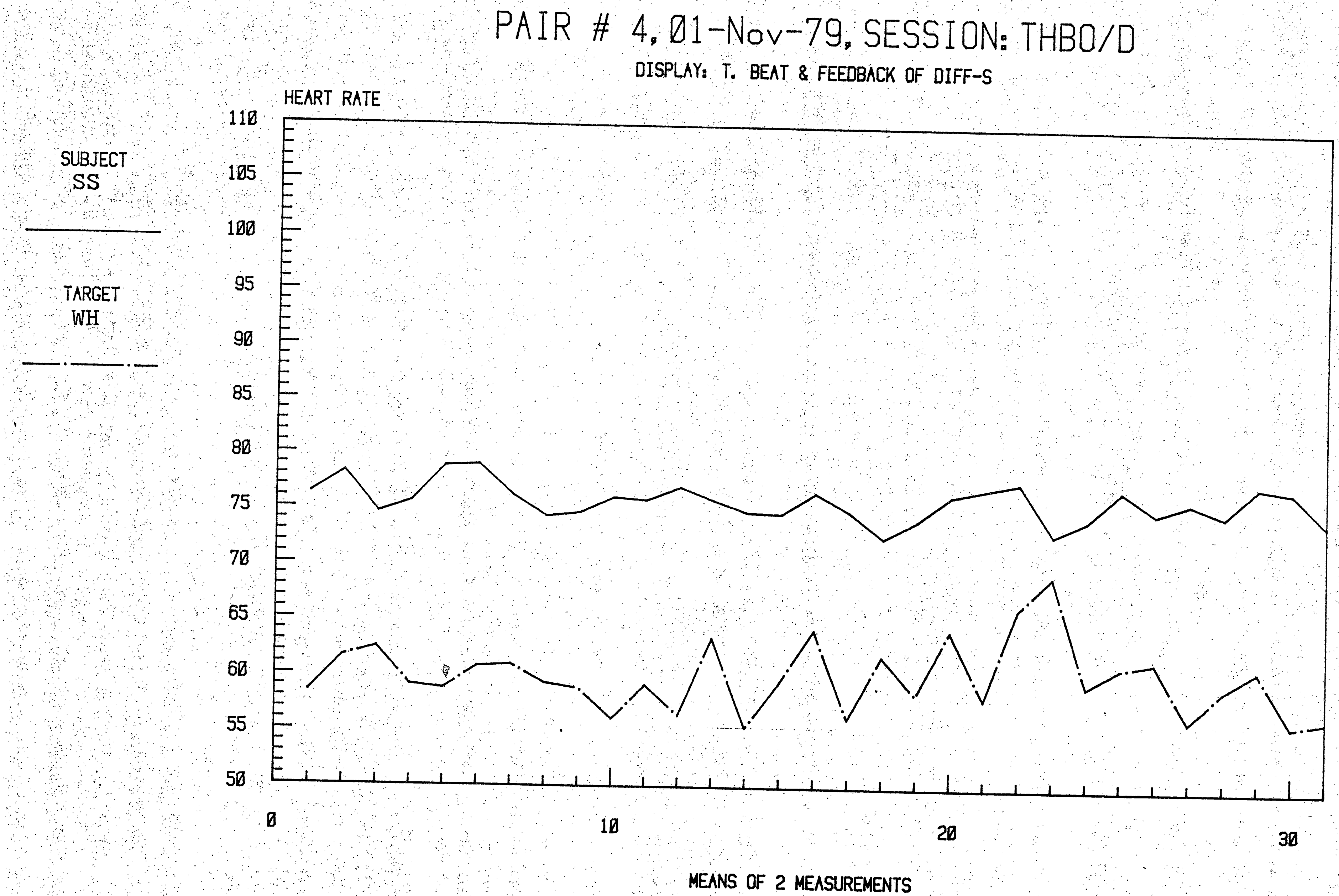
Graph 30

PAIR # 4, Ø1-Nov-79, SESSION: SHBO/D

DISPLAY: S. BEAT & FEEDBACK OF DIFF-S

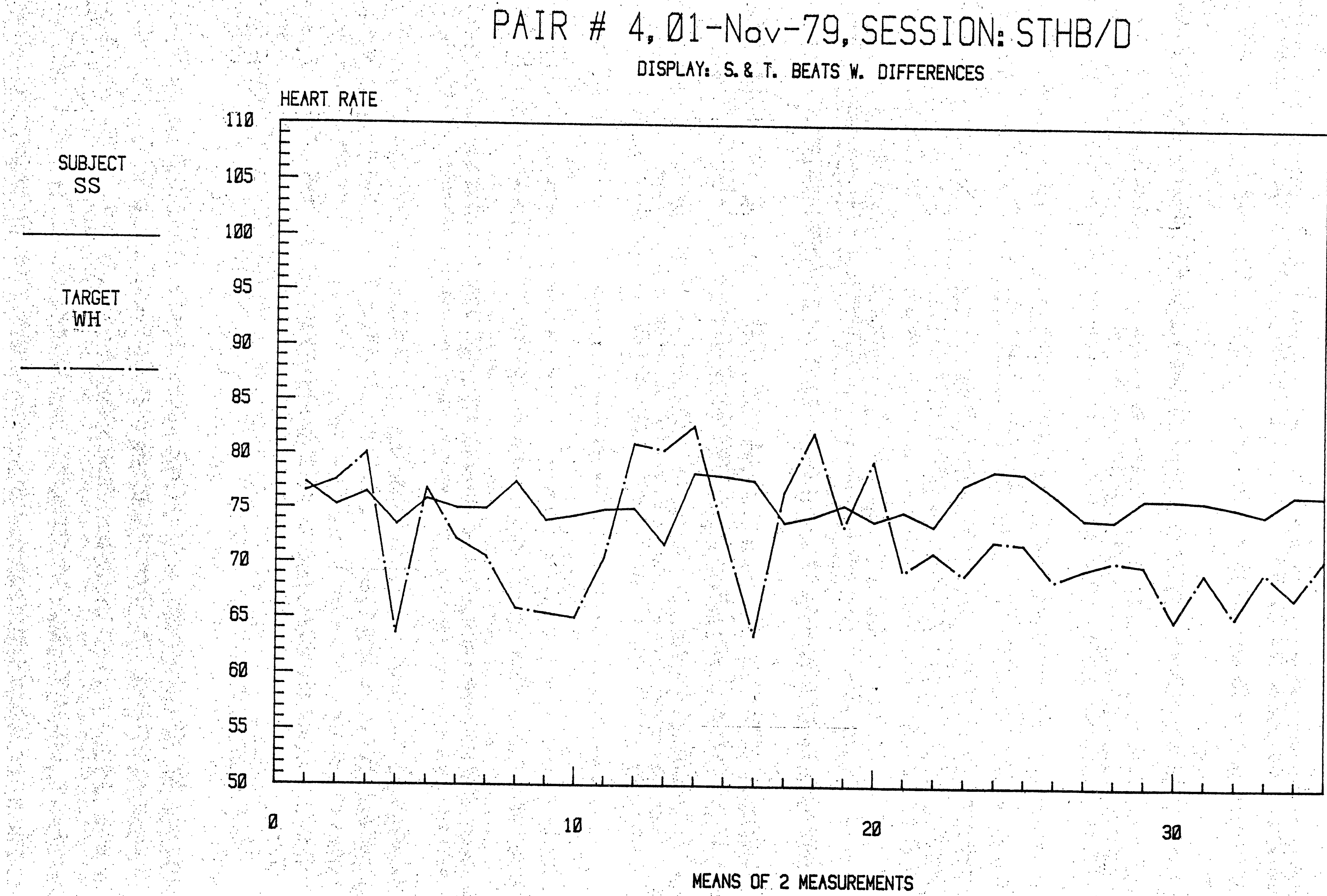


Graph 31



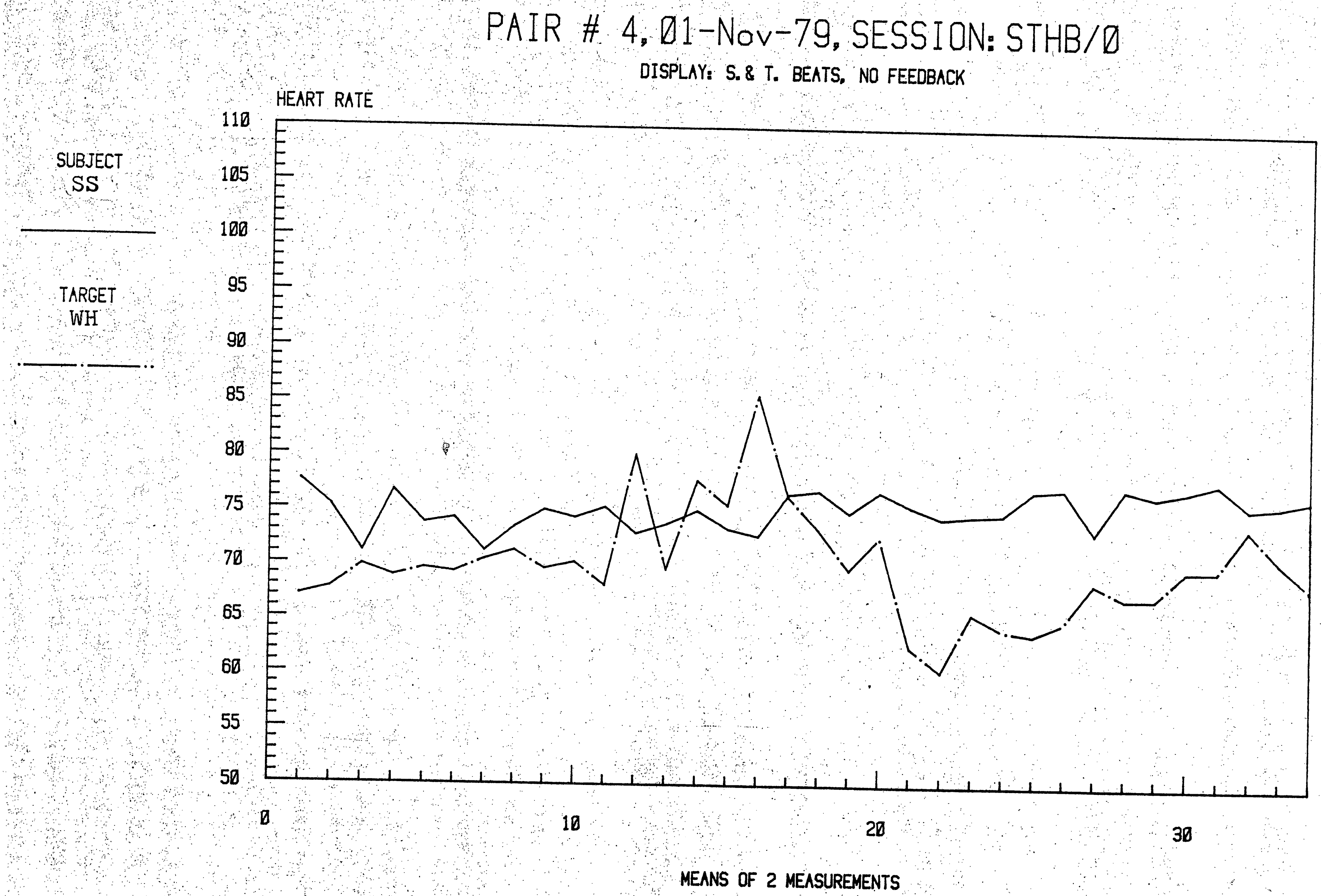
PAIR # 4, 01-Nov-79, SESSION: THBO/D
DISPLAY: T. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 32



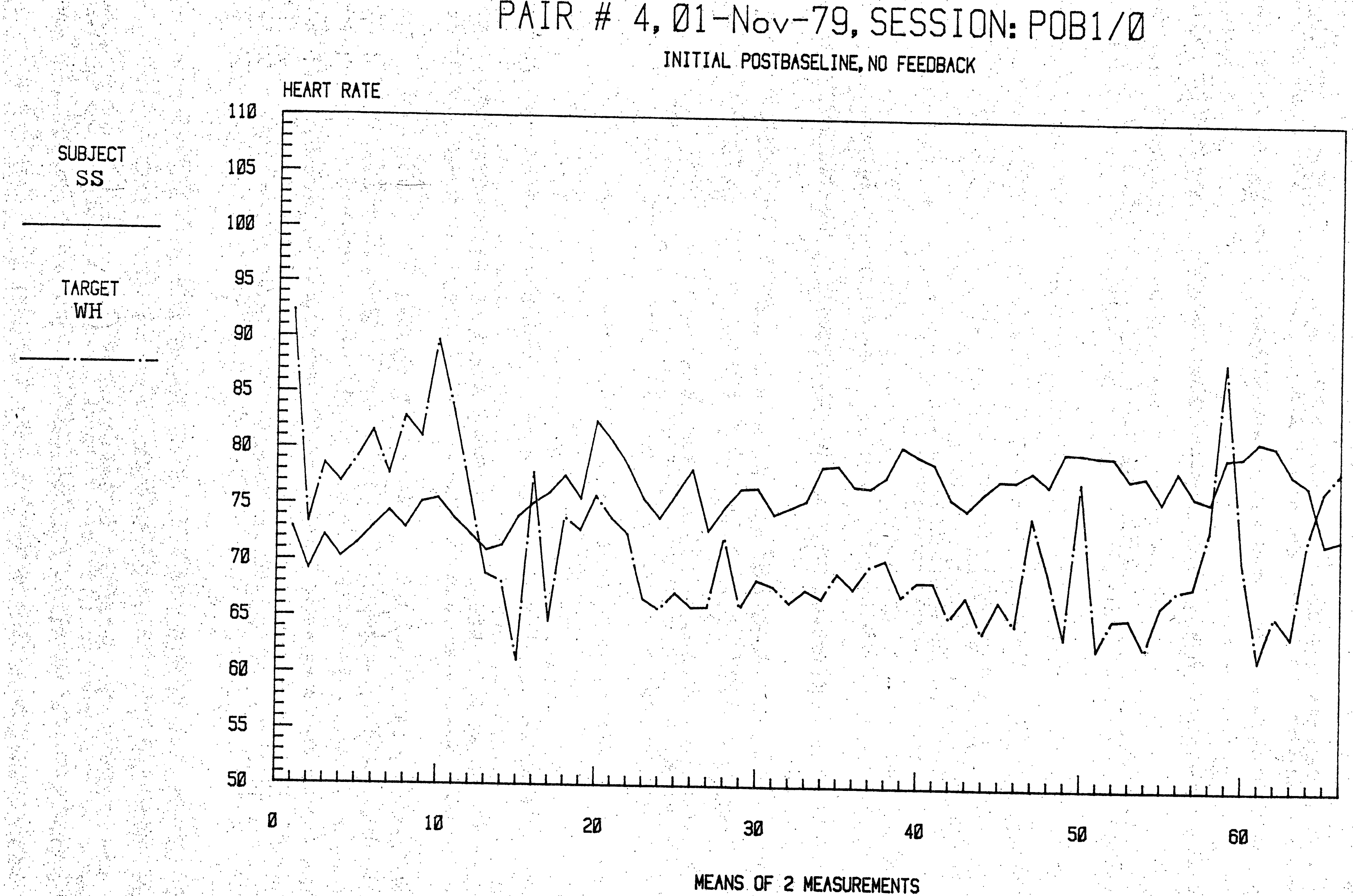
PAIR # 4, Ø1-Nov-79, SESSION: STHB/D
DISPLAY: S. & T. BEATS W. DIFFERENCES
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
Ø
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 33

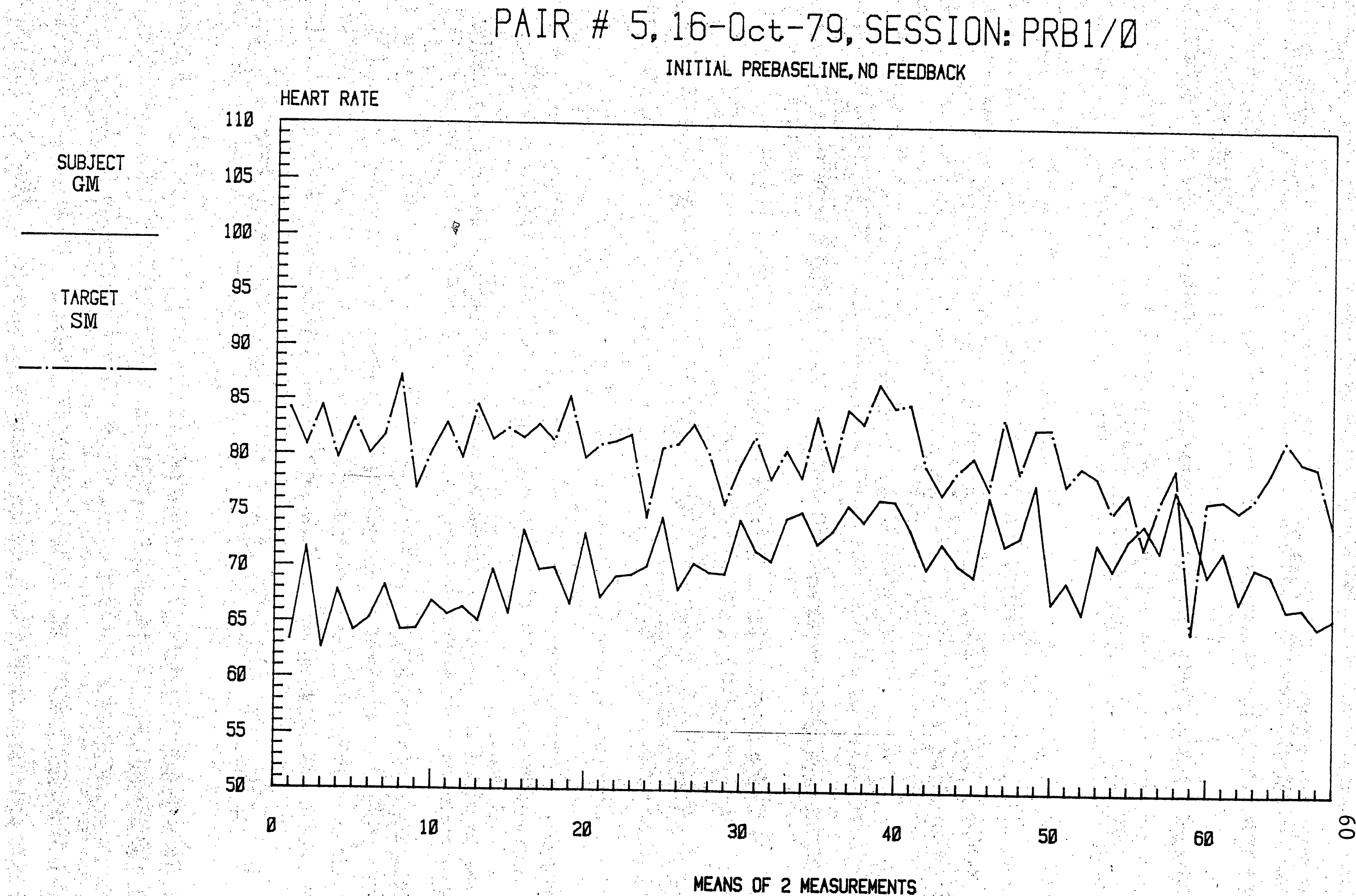


PAIR # 4, Ø1-Nov-79, SESSION: STHB/Ø
DISPLAY: S. & T. BEATS, NO FEEDBACK
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
Ø
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 34


PAIR # 4, Ø1-Nov-79, SESSION: POB1/Ø
INITIAL POSTBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
SS
TARGET
WH
110
105
100
95
90
85
80
75
70
65
60
55
50
Ø
1Ø
2Ø
3Ø
4Ø
5Ø
6Ø
MEANS OF 2 MEASUREMENTS

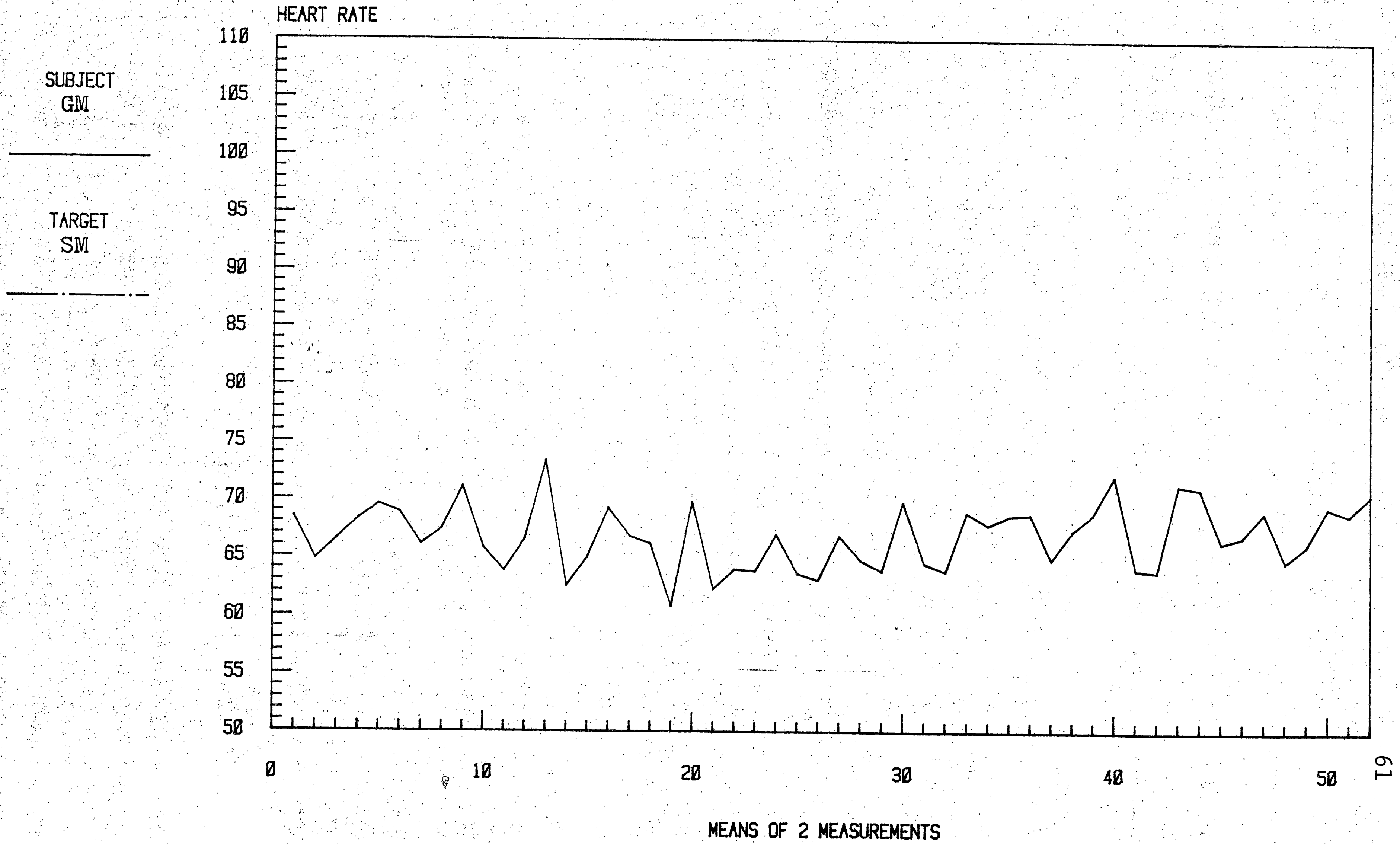
Graph 35


PAIR # 5, 16-Oct-79, SESSION: PRB1/0
INITIAL PREBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
GM
TARGET
SM
110
105
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
40
50
60
60
MEANS OF 2 MEASUREMENTS

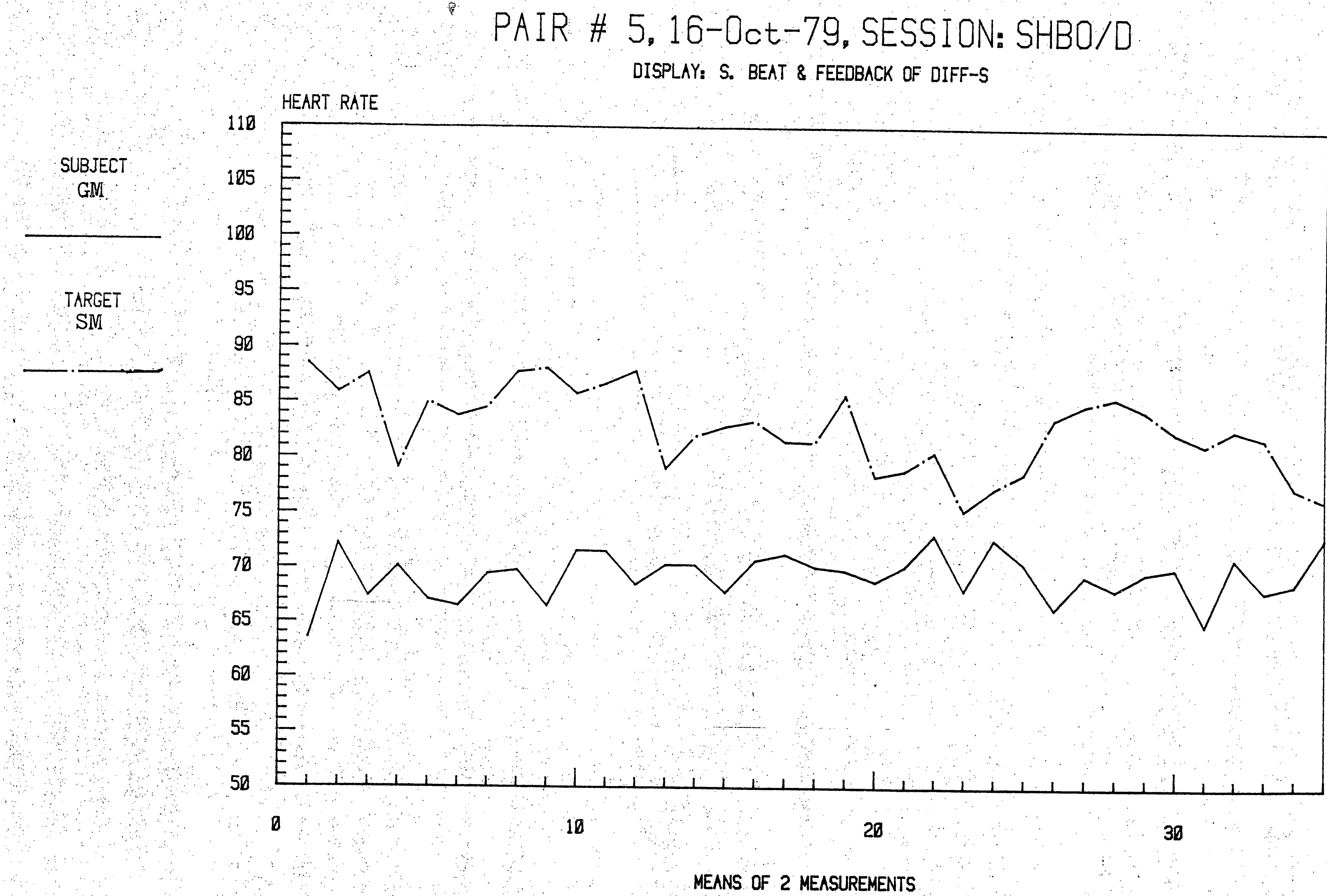
Graph 36

PAIR # 5, 16-Oct-79, SESSION: SHBO/C

DISPLAY: S. BEAT & FEEDBACK OF CHANGE



Graph 37

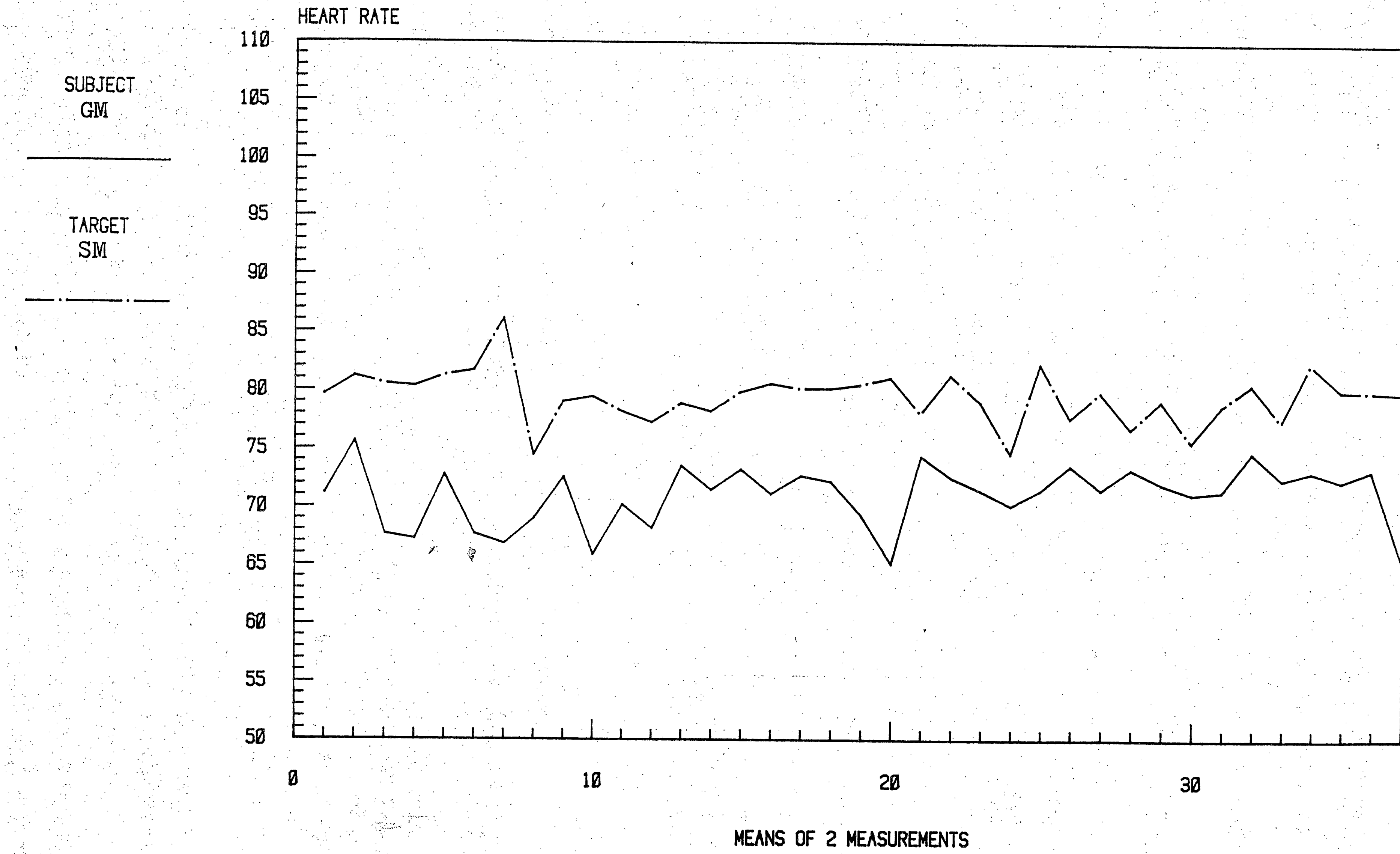


PAIR # 5, 16-Oct-79, SESSION: SHBO/D
DISPLAY: S. BEAT & FEEDBACK OF DIFF-S
HEART RATE
SUBJECT
GM
TARGET
SM
110
105
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
MEANS OF 2 MEASUREMENTS

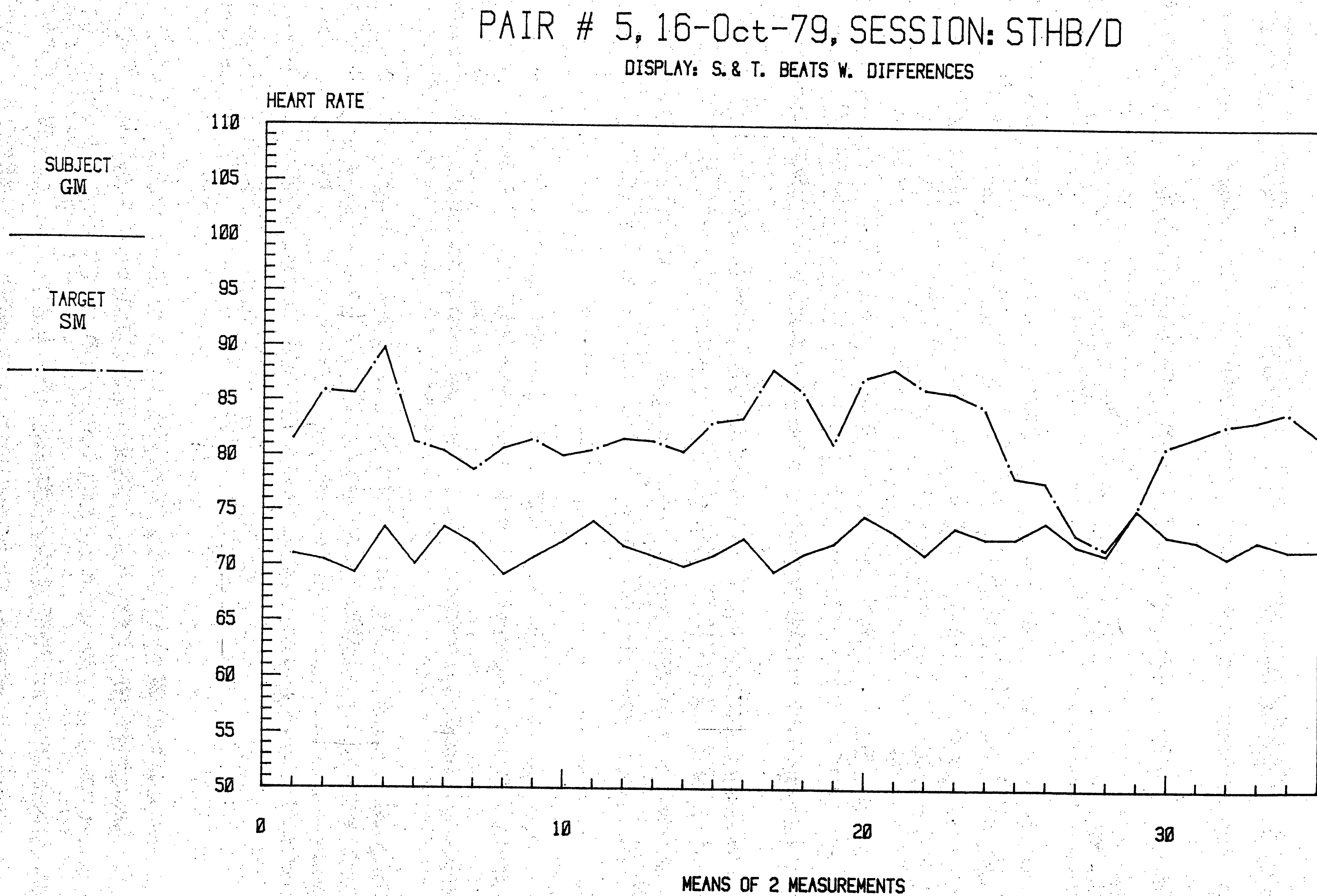
Graph 38

PAIR # 5, 16-Oct-79, SESSION: THBO/D

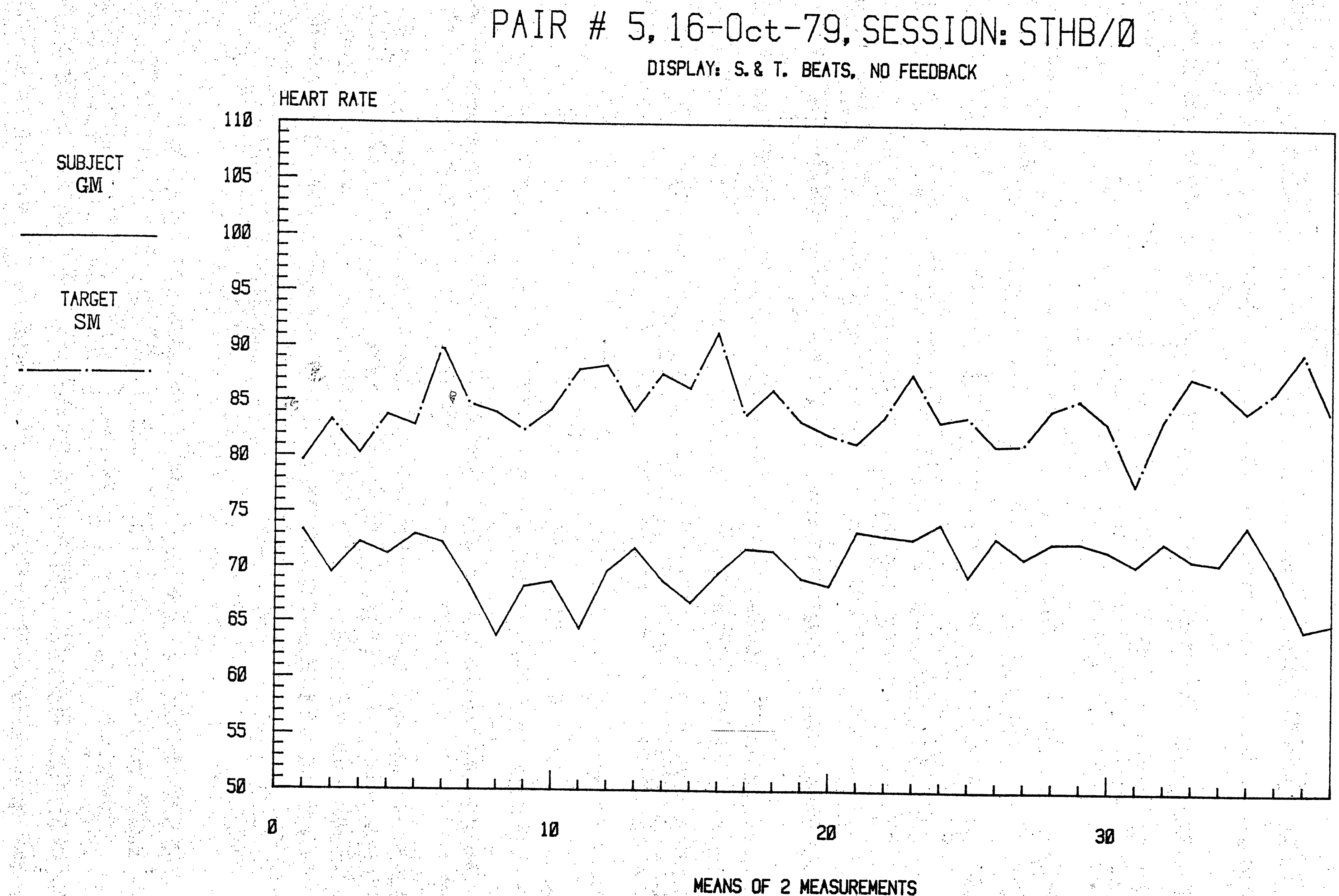
DISPLAY: T. BEAT & FEEDBACK OF DIFF-S



Graph 39

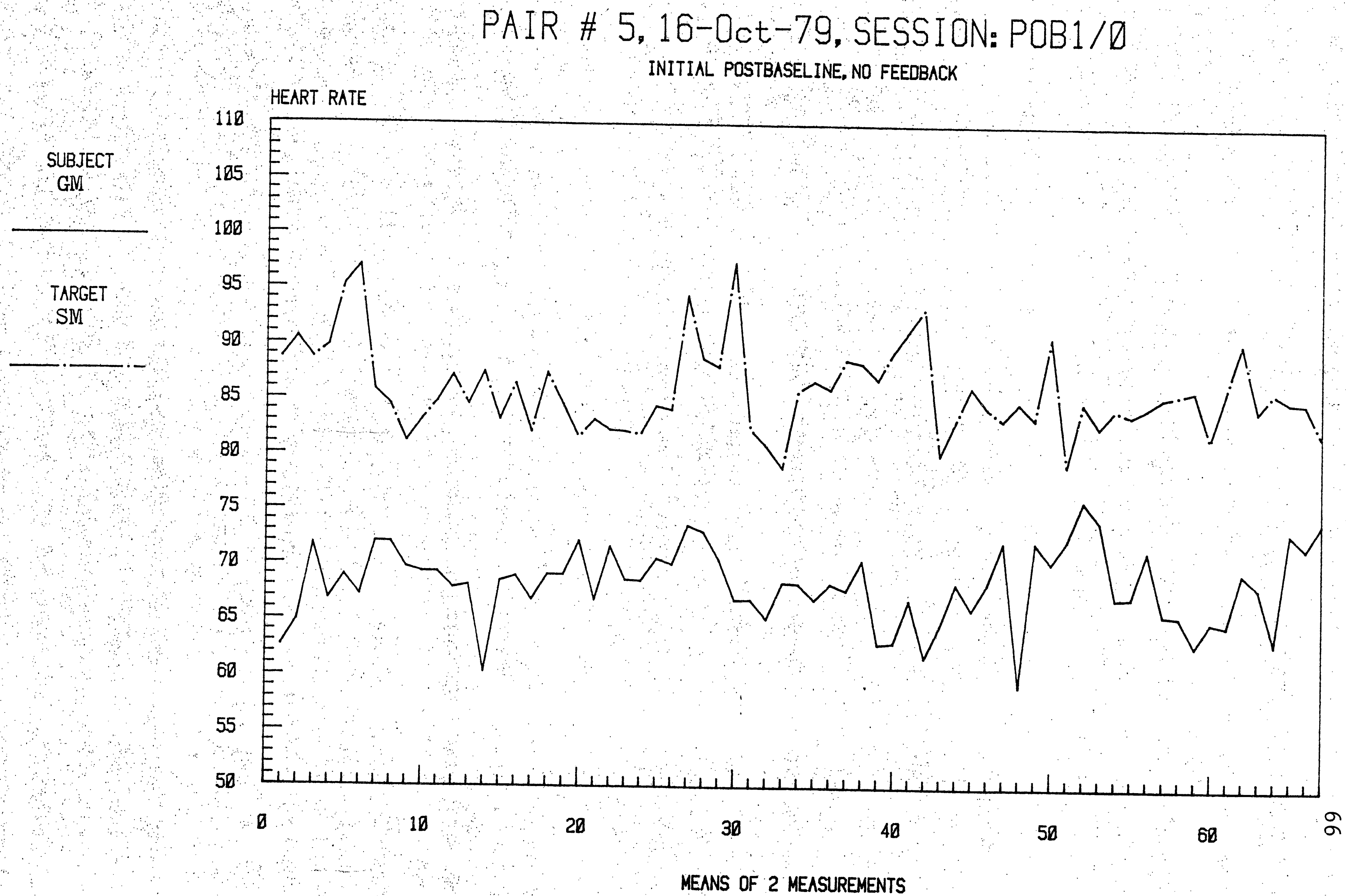

PAIR # 5, 16-Oct-79, SESSION: STHB/D
DISPLAY: S. & T. BEATS W. DIFFERENCES
HEART RATE
SUBJECT
GM
TARGET
SM
110
105
100
95
90
85
80
75
70
65
60
55
50
0
10
20
30
MEANS OF 2 MEASUREMENTS

Graph 40



PAIR # 5, 16-Oct-79, SESSION: STHB/Ø
DISPLAY: S. & T. BEATS, NO FEEDBACK
HEART RATE
SUBJECT
GM
TARGET
SM
11Ø
1Ø5
1ØØ
95
9Ø
85
8Ø
75
7Ø
65
6Ø
55
5Ø
Ø
1Ø
2Ø
3Ø
MEANS OF 2 MEASUREMENTS

Graph 41


PAIR # 5, 16-Oct-79, SESSION: POB1/Ø
INITIAL POSTBASELINE, NO FEEDBACK
HEART RATE
SUBJECT
GM
TARGET
SM
110
105
100
95
90
85
80
75
70
65
60
55
50
Ø
10
20
30
40
50
60
66
MEANS OF 2 MEASUREMENTS

DISCUSSION

The results indicate that all subjects, except for the subject in Pair 3, were able to learn control of their own heart rates through biofeedback training, as evidenced by SHBO/C variance being less than PRB1/O variance. The overall results suggest that four out of five Pairs might have exhibited effects of psi on heart rate. Due to the lack of a proper time series analysis these results must be considered a strong possibility that should be further explored. The results of each Pair are discussed separately.

Pair 1

During the initial session a positive correlation occurred during the SHBO/D experimental condition (see Graph 3, pp. 28). The subject did not hold his heart rate steady, and did not accomplish the task of bringing the target's heart rate closer to his own. As this was the first experimental condition received, the lesser correlation, which included the first 30 sec of the run, could have been due to the Pair's adjustment to the changed situation. The subject's and target's heart rates increased and decreased together rhythmically, over very short intervals of time, particularly during the later half of the condition. Heart rate is a relatively slow response, so if the subject was using the D feedback to shadow the target's heart rate, then one would expect the changes in the subject's rate to lag behind the corresponding changes in the target's. Since no lag is obvious, psi might have been responsible for the rhythmic relationship between heart rates.

The lack of correlations during the later experimental conditions may have been due to an eposodic decline effect, or some sort of neurologically fatiguing or inhibiting force (Carpenter, 1977).

During the return session there was a negative correlation between heart rates during POB2/O (see Graph 9, pp. 34). Glancing at the data, it appears that the subject's heart rate remained relatively stable over the entire return session, while the target's heart rate decreased toward the subject's rate during POB2/O. Especially interesting to note on Graph 9 is the rhythmic closeness of heart rates during the central two minutes of POB2/O. Since there was no instructions to the subject except to relax, and no feedback, psi is again indicated as possibly being involved in the correlation.

Pair 2

In the initial session, during PRB1/O there was a positive correlation between heart rates (see Graph 10, pp. 35). Further analysis revealed that the correlation was within the first two minutes of the baseline, with no correlation during the later part of the baseline (between 181-298 sec). A glance at the data suggests that the subject's and target's heart rates were decreasing during the first half of baseline, and relatively stable during the last half. Thus, this correlation might be explained as a result of the Pair's relaxing in the experimental setting, rather than as a result of psi. However, a notable coincident increase in heart rates occurred during the first two minutes of the baseline. The purpose of the baseline, to establish mean heart rate and mean variance, may be somewhat confounded by the correlation.

During the THBO/D experimental condition there was again a substantial positive correlation between heart rates. The subject's mean variance, SD = 2.81 bpm, remained less than her mean PRB1/O variance, SD = 4.43 bpm. However, the target's mean variance, SD = 5.24 bpm, was also less than her mean PRB1/O variance, SD = 6.97 bpm, making conclusions difficult to draw. Due to the strong indications that during the first two minutes of PRB1/O the Pair's heart rates were decreasing as they relaxed in the experimental setting, one might consider only the later part of PRB1/O (181-298 sec) for the establishment of mean baseline variance. Then the subject's mean THBO/D variance, SD = 2.81 bpm, was less than her mean PRB1/O variance, SD = 3.55 bpm, while the target's mean THBO/D variance, SD = 5.24 bpm, is considerably greater than her baseline variance, SD = 2.66 bpm. The participants accomplished the task of bringing their heart rates closer together by the target's heart rate increasing toward the subject's. Thus, perhaps psi was responsible for the correlation between heart rates during THBO/D.

The results of the STHB/D experimental condition again show a positive correlation (see Graph 14, pp. 39). During this run the subject held her mean variance, SD = 2.62 bpm, far below that of the later part of PRB1/O, SD = 3.55 bpm. The target almost doubled her mean STHB/D variance, SD = 5.91 bpm, over the later part of PRB1/O, and increased her mean heart rate by 4.49 bpm toward the subject's rate. Since the changes in variance and heart rate occurred in the target, this correlation may have been due to psi.

Pair 3

In the initial session, during the SHBO/D experimental condition there was a negative correlation between heart rates, but only during the first two minutes of the run (see Graph 21, pp. 46). Glancing at the data, the subject's heart rate appears to have decreased from her PRB1/O rate by approximately 6.22 bpm, while the target's heart rate increased by 4.10 bpm. Since the subject did not hold her heart rate steady, and did not accomplish the task of bringing the target's heart rate closer to her own, conclusions as to the source of the relationship are not easily drawn.

During the THBO/D experimental condition a negative correlation occurred (see Graph 22, pp. 47). The subject was receiving feedback on the target's heart rate, and did not hold her own heart rate steady. The participants did not accomplish the task of bringing their heart rates closer together than they had been during PRB1/O. However, within the THBO/D condition their rates did come closer together from the first to the last half of the run. Since the subject's variance remained constant while the target's increased, this correlation may have been due to psi.

When Pair 3 returned to the lab, a substantial correlation occurred during the STHB/O experimental condition (see Graph 26, pp. 51). The subject did not hold her heart rate steady, but instead decreased her rate toward the target's. The target's heart rate also changed, increasing toward the subject's rate. Thus, the participants did accomplish the task of bringing their heart rates closer together than they had been during PRB2/O. An examination of Graph 26 reveals that the increases and decreases in the Pair's heart rates coincide over short intervals of time in a rhythmic fashion. Since the changes in the subject's heart rate do not appear to lag behind the corresponding changes in the target's rate, the subject was not utilizing the trace image feedback to shadow the target. Indeed, the target's changes appear to shadow the subject's. Thus, the influence of psi may be indicated by this correlation.

Pair 4

In the initial session, during PRB1/O a correlation occurred between heart rates (see Graph 28, pp. 53). During the later half of PRB1/O the positive correlation endured. A glance at the graph indicates that the subject and target maintained relatively stable heart rates, except for a sudden increase in the target's rate toward the subject's during the central two minutes of PRB1/O. The graph negates the alternative explanation of the correlation being due to effects of initial relaxation in the experimental setting. During POB1/O the participants did accomplish the task of bringing their heart rates closer together (see Graph 34, pp. 59). The results of Pair 4 are quite unusual, as the correlations only occurred during PRB1/O and POB1/O, almost in direct opposition to instructions.

Could the results of Pair 4 indicate a sheep-goat effect (Van de Castle, 1957; Schmeidler and McConnell, 1958; Osis and Dean, 1964; Palmer, 1977), in a performance strangely resembling below-chance expectancy? The data collector recalled that before the experimental session began the target said that he refused to perform a phenomenon that he did not believe existed. During the pilot study this participant had expressed doubt in the existance of psi, but not strong disbelief. This target's questionaire answers seem to support a disbelieving, resistant attitude. When asked by the questionaire whether he believed ESP was possible, the target answered "no". On the identical pilot questionaire his answer to the same question was "yes". This target was the only participant during the pilot and experiment who answered "no" to number one on the questionaire.

Approximately two months after the session of Pair 4, the data collector carefully questioned this target, who was yet unaware of the experiment's results. The target said he felt rather confused about what ESP is. During the pilot he thought of ESP as a "large body of unexplained phenomenon", which he "believed to exist", and had therefore answered "yes" to question number one in the pilot. When filling out the questionaire for the present experiment, he viewed question number one as "referring to the specific phenomenon of telepathy", which he "neither believed nor disbelieved existed". He also recalled of having been in a general bad mood during the day of the session, and of feeling rather depressed and frustrated. The results of former studies suggest that feelings of conflict concerning the possible existance of ESP, and a general bad mood, would predict below-chance scoring (Van de Castle, 1957; Schmeidler and McConnell, 1958; Osis and Dean, 1964; Kanthamani and Rao, 1973; Stanford, 1976; Carpenter, 1977; Palmer, 1977; Kennedy, 1979).

Pair 5

During the initial session of Pair 5 there were no correlations.

Summary

Due to the controversial aspects of the statistics utilized a time series analysis must be developed and applied to the data before definite conclusions can be drawn. Looking at the overall results of the present statistical approach in combination with the demography and questionaire information, certain patterns may emerge. Substantial correlations occurred in Pairs 1, 2 and 3, who were same-sex partners. An unusual relationship was displayed by Pair 4, and none by Pair 5, who were opposite sex partners. Research at Maimonides (Ullman, Krippner, and Vaughan, 1973) indicates the possibility of American cultural barriers to psi performance when male subjects are paired with female targets, as in the case of Pair 5.

Concerning belief in ESP, Pairs 1 and 2 had strong belief, but so did Pair 5, who did not perform well. Thus, no further patterns seem to emerge from belief factors other than those previously discussed involving Pair 4.

No patterns emerge concerning enthusiasm about participating in the experiment. Rapport, on the other hand, may show a pattern that could be linked to the notable correlations. In Pairs 2 and 3 the partners felt high rapport with one another, and strong correlations between heart rates occurred. Substantial correlations also occurred in Pair 1, in which the subject felt high rapport for the target, while the target felt neutrally toward the subject. In Pair 4, where the unusual "goat" effect may have occurred, the participants felt neutrally toward one another. In Pair 5 the subject felt neutrally toward his target. In all instances of implied psi-hit effect (as opposed to the possible psi-miss effect of Pair 4) the subject felt high rapport with the target. The suggested effects of high rapport deserve further study.

The overall results of this experiment suggest that four out of five Pairs may have indicated effects of psi on heart rate. This ratio of suggestive results is unusual among studies investigating psi. Certainly, the direct approach of transmitting psychophysiological responses, as facilitated by biofeedback methods, deserves further study. Future researchers might attain further control by sound-insulating the subject from the noises produced by the experimenter. Reordering the presentation of feedback conditions within one session should eliminate the subject's becoming aware of the target's heart rate relative to his or her own rate, prematurely. This suggested reordering of conditions could be as follows: prebaseline; SHBO/C; a new experimental condition with no trace image or digital feedback (NONE/O); SHBO/D; THBO/D; STHB/O; and postbaseline. Future subjects might be aided in holding their heart rates steady by the introduction of continuous auditory feedback on their own heart throughout the session. For example, a high pitched tone could sound if the subject's heart rate increased beyond the range established during prebaseline, and a low pitched tone could sound if the rate dropped below the subject's prebaseline range.

APPENDIX A

Confidential
Questionaire

Subject/Target ________________
Age: ________________
Sex: ________________

	Circle one:
1. Do you believe that ESP is possible?	yes no
2. Have you ever had spontaneous ESP experiences?	yes no
3. Do you believe that you have some amount of control over your ESP experiences?	yes no
4. Are you enthused about participating in this experiment?	yes no
5. Have you ever been diagnosed or treated for a heart condition?	yes no

6. Circle the answer that most closely corresponds to the amount of rapport that you feel with your partner:

high rapport	neutral rapport	no rapport
(you like your partner a lot)	(you neither like nor dislike your partner)	(you dislike or feel uncomfortable with your partner)

I agree to participate in this pilot/experiment on telepathy and heart beat with the understanding that the experimenters know of no maleffects of such experimentation and that I thus will not hold the experimenters or Cal State College, San Bernardino responsible for any phsyiological or psychological maleffects should they occur.

I also understand that all the information obtained in this experiment except my name and place of residence may be made public.

Signature: ________________________ Date: __________

APPENDIX B

Data Collector's Attitudes, Motivation, and Rapport with Individual Participants

<u>Data Collector:</u> J. K. Stewart
<u>Age:</u> 31
<u>Sex:</u> Female

<u>Attitudes:</u>

1. Do you believe ESP is possible? — yes
2. Have you ever had spontaneous ESP experiences? — yes
3. Do you believe you have some amount of control over your ESP experiences? — yes
4. Are you enthused about conducting this experiment? — yes

<u>Motivation:</u>

Extreme personal interest in investigating psi over the past 10 years

<u>Rapport Felt Toward Participants:</u>

PAIR	HIGH RAPPORT subject	HIGH RAPPORT target	NEUTRAL RAPPORT subject	NEUTRAL RAPPORT target	NO RAPPORT subject	NO RAPPORT target
1	X	X				
2		X	X			
3	X			X		
4	X	X				
5	X			X		

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