



Mini Review

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Milgram Obedience Experiments Revisited: Audio-Analysis can Biologically Ground Functional Seizures

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Abstract

Stanley Milgram reported Seizures (SZ) in 15 of his 160 male community volunteers participating in 4 Conditions of experiments. His protocol included audio-recording of the entire engagement by his Volunteer Teacher (V-T), sometimes lasting nearly one-hour. Digitized audio-data later allowed off-site play-back. V-T action was measured as time lapse between succeeding administrations of electric shock to his Confederate Learner (C-L) for incorrect answer and was converted to time-series for between-subject comparison. High correlation was shown between SZ reported in Milgram's publications and Adverse Events (AE), defined as prolonged Affect Perturbation (AP).

Keywords: Epilepsy, Seizure, Functional seizure, Milgram, Learning, Punishment

Introduction

Milgram's laboratory experiments involved 3 participants: Volunteer-Teacher (V-T), Confederate-Learner (C-L) and Experimenter-Monitor (E-M) [1,2]. V-T was required to punish C-L for each mistake, triggering an electric shock at intensity of 15-v increment in 30 steps up to 450 v. V-T and E-M were in one room, while C-L was in another for Conditions 1 and 2 with audio feedback added in Condition 2. V-T and C-L were placed in the same room in Condition 3 and 4. In Condition 4, V-T was to hold C-L's hand down to maintain electrode contact, when C-L refused to cooperate. There were 3 breaks when alteration in V-T task was introduced; 1) practice run ended after 105-v shock, 2) C-L requested to 'get me out of here' after 150-v shock, and 3) C-L refused to answer after 300-v shock. E-M instructed V-T to wait 5 seconds and, if no answer, proceed with shock at the next level. C-L returned a carefully scripted series of answers consisting of randomly occurring, frequent mistakes (typically correct 11 times, incorrect 27 times and refusing 12 of 50 answers to complete Protocol) and repeated with each V-T. Correct responses did not result in Affect Perturbation (AP), and delayed V-T action only by a few seconds.

E-M would only remind V-T of Protocol tasks, and urge to continue, while C-L directed vigorous protest to V-T. C-L, however, was

not receiving electric shocks. V-T were not informed of the right to withdraw consent. Only some V-T asserted their right and refused to continue. AP often overwhelmed V-T, leading to escalating distress, helplessness, and loss of control, reflected in alteration of voice intensity, pitch and rhythm, at times intermixed with laughing, and/or immobilization: the more severe AP, the longer delay. Prolonged AP is associated with behavior dissociation and/or arrest, and V-T will soon fail to administer shock, a sequence tending to SZ. E-M neither narrated V-T behavior nor voiced reason for termination. Milgram differentiated SZ from AP in publications [1,2]. Even without a recorded description of V-T behavior, AP and SZ reported by Milgram should correlate differentially with delay in shock administration. The objective of this explorative study, therefore, was to find a threshold delay that can reproduce Milgram's report of SZ occurrences. Use of abstracted data was granted by the Milgram family.

Methods

Experimental data were archived at Yale University library, where 47 audiotapes were played back in 2015. It was found easy to follow V-T actions and emotional tone. Digital data later became available for off-site examination. The protocol was segmented by



44 clocking points, consisting of 39 shock administrations, 3 breaks and termination, and elapsed time between succeeding shocks was chosen as single biological measure. Measurement was applied to a total of 139 digital audio-recordings. No digital data could be recovered from 2 recordings. A single examiner listened to audio-play-

back and recorded 44 elapsed times. Time intervals between succeeding shocks formed a set of time series for each V-T. Data sets thus collected were converted to time-series display for visual inspection on Excel spreadsheet (Figure A, Table 1).

Table 1: Protocol Completion, full and partial.

	N	Practice	To 150v	To 300v	To 450v	Completion
Condition 1	28	0	0	4	5	19 (68%)
Condition 2	40	0	6	4	5	25 (63%)
Condition 3	40	0	11	9	6	14 (35%)
Condition 4	29	0	8	11	1	9 (31%)
Total	137	0	25	28	17	67 (49%)

Results

Analysis of V-T performance yielded 137 time series, and were tabulated, according to experimental conditions and Protocol stages. 25 V-T had dropped out by the end of initial stage (150-v shock).

Proximity of C-L to V-T was decreased from Conditions 1 through 4, resulting in progressive decrease of completion. At entry to the final stage, when C-L refused to answer, 24, 30, 20 and 10 V-T were remaining for Conditions 1 through 4, respectively (Figure).

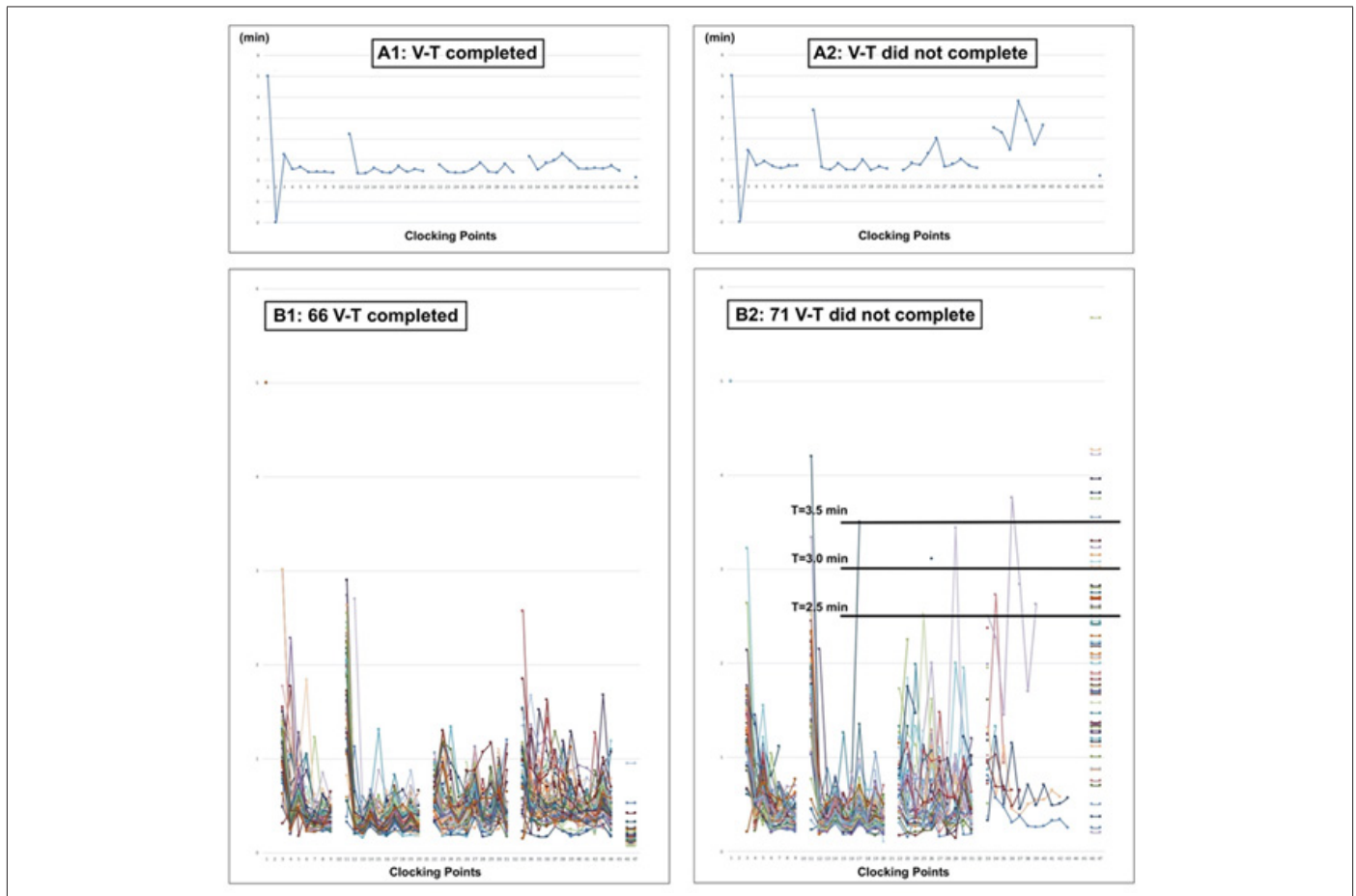


Figure:
Figure A: Horizontal axis of time-series display consisted of 46 clocking points, following initial 2-point values (5 and -2 min) for vertical axis calibration. Protocol completion was clocked at point 46 (even when Protocol was not completed). Points 10, 21, 32 and 45 were assigned with no time value to give breaks in display. The first shock administered immediately after break was normally delayed for instruction over procedural alteration. Protocol completion required 3 450-v shock administrations, because C-L refused to answer. A1 represents Protocol completion without significant AP. A2 displays a 2-min delay at point 26 (225-v shock). This V-T went on to exhibit further prolongation of delay approaching 4 min at point 36 (360-v shock) and was still able to continue Protocol despite AP. Protocol was terminated by E-M at point 39 (405-v shock).
Figure B: Composite time series displays with vertical scale adjusted for easy comparison of AP between 2 groups: B1) 66 V-T completed Protocol, and B2) 71 V-T did not. Delay immediately following breaks must be ignored except at Protocol termination. Isolated delay plots represent Protocol deviation secondary to V-T skipping shock level(s). Point 47 duplicated point 46 to make visible terminal time lapse. There is apparent correspondence of prolonged AP peaks between Fig A2 and Fig B2.

It was found that some V-T continued to interact with E-M and secured termination during AP resulting in delay longer than 2 min. With delay Threshold (T) set at 2.5, 3.0 and 3.5 min, Adverse Events (AE) would have occurred 27, 16, and 9 times, respectively (Figure B).

Milgram's report of SZ in 15 of 160 V-T (9.4 %) would favor T 3.0 min [1,2]. Thus defined, AE occurred 16 times in 15 (10.9 %) of 137 V-T. Two V-T resumed Protocol tasks after AE prior to termination by E-M. AP did not always increase beyond 300-v shock, as Protocol completion was approached, while the number of remaining V-T was progressively decreasing. C-L continued with protest, after he refused to answer.

Discussion

Milgram had in mind designing a protocol to examine normal male community volunteer's obedience to authority and did not inform V-T of his right to withdraw. V-T behavior, leading to AE, consisted mostly of chaotic primitive behavior fragments. V-T believed that C-L was another volunteer with background similar to his own, finding himself in a situation without effective choice of alternative actions to regain affect control. The findings can then be interpreted applying Gregory Bateson's concept of double bind [3], and interactions can possibly be viewed as those of bullying. AE were dissociative events consistent with psychogenic non-epileptic SZ [4], a medical diagnostic term currently being replaced by another, functional SZ [5]. A single personal crisis created by complex adverse social-psychological interactions alone induced SZ. De-briefing was provided without formal follow up. There has been no mention of SZ in Milgram's subsequent publications. Neurological diagnostic investigation for SZ, Video-EEG monitoring [6], was not performed.

It is well understood that a single SZ does not warrant the diagnosis of epilepsy. Critical data seem missing, however, concerning how functional SZ recurs, and becomes refractory in some individuals. Method for examining differential contributions of individual psychopathological and social psychological factors is urgently needed. Configurations of normal human interactions change constantly and are beyond the domain of clinical medical investigations. Social psychological factors, however, warrant vigorous screening. Audio-recording was particularly suitable for assessment of AP by

making available psychobiological measure of affect control which is not reliably reflected in narrative summary and often results in disagreement among witness reports. Including a 1964 proposal of pseudoseizures as alternative term [7], the literature of functional SZ is extensive. Functional SZ are medically unexplained and have also been referred to as Illness behavior [8]. A special academic journal issue in 2014 [9] attests to the continued scientific relevance of the Milgram experiments.

Conclusion

This preliminary investigation sought to biologically ground functional SZ reported among Milgram's V-T.

Acknowledgements

None.

Conflict of Interest

None.

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