



## Research in Developmental Disabilities

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# Side effects of contingent shock treatment

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### Abstract

In this study, the side effects of contingent shock (CS) treatment were addressed with a group of nine individuals, who showed severe forms of self-injurious behavior (SIB) and aggressive behavior. Side effects were assigned to one of the following four behavior categories; (a) positive verbal and nonverbal utterances, (b) negative verbal and nonverbal utterances, (c) socially appropriate behaviors, and (d) time off work. When treatment was compared to baseline measures, results showed that with all behavior categories, individuals either significantly improved, or did not show any change. Negative side effects failed to be found in this study.

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### Section snippets

#### Participants and setting

Participants were nine students (i.e., five boys and four girls) of the Judge Rotenberg Educational Center (JRC) in Canton, MA. Participants' chronological ages ranged from 8 to 30 years ( $M = 16.2$ ,  $S.D. = 5.5$ ) at the start of the study. All of them showed high frequencies and severe forms of SIB and aggressive behavior. Functional assessments were conducted to assess which factors might cause or maintain participants' target behaviors, revealing that the behaviors were either multiply controlled or ...

## Device

Skin shocks were administered using the graduated electronic decelerator (GED) which is manufactured by JRC, consists of: (a) a remote control transmitter, which transmits an uniquely coded RF signal; (b) a receiver/stimulator, which receives a coded signal from the transmitter and generates a skin shock; (c) a battery pack; and (d) a set of electrodes, which are attached to participant's skin. Electrodes were either concentric (i.e., Tursky electrodes) or spread with two button electrodes...

## Response definitions

Four mutually exclusive categories of target behaviors were defined: (a) positive verbal and nonverbal utterances (PVNU), such as appropriate smiling, dancing, singing or talking (e.g., "I am so happy," "Oh, yes!"); (b) negative verbal and nonverbal utterances (NVNU), such as crying, making whining noises, spitting, stamping feet, smearing faeces, screaming, swearing, making obscene gestures, shrugging shoulders, uttering racial comments, making negative facial expressions (e.g., rolling eyes), ...

## Recording

During baseline and treatment, participants were videotaped for 10 min, 5 days per week. Participants were videotaped at randomly chosen points in time, but always during times when teachers and staff members were not applying reinforcing contingencies. Using a 10-s partial interval recording system, observers assigned each target behavior to one of the above four behavior categories. All target behaviors that occurred during videotaping were assigned to a category, even when behaviors occurred...

## Reliability of recording

Interrater agreement between two observers, one of whom was kept naive as to the purpose of the study, was conducted in 26% of the recording sessions, which were approximately equally distributed across baseline and treatment phases. Agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements, multiplied by 100. Interrater reliability ranged from 93.48 to 97.76% ( $M = 95.48$ ,  $S.D. = 1.85$ ). Percentages were then converted into a kappa coefficient (...)

## Baseline

During baseline, CS treatment was withheld. During this phase, (a) differential reinforcement of other behaviors with intervals ranging from 5 min to 7 days, (b) a token system for completing academic tasks and/or for intervals of appropriate behavior, and (c) a response cost system were in effect. Moreover, mild aversive procedures and response contingent restraints were in effect. Duration of mechanical (e.g., mitts, restraint chair) or physical restraint (i.e., holding arms, legs, and upper...

## Design

Data were collected using a nonconcurrent quasi-multiple baseline design across participants (Watson & Workman, 1981), in which the length of the baseline phase was determined on a random basis. For each participant, the date at which the treatment phase began was determined by the date at which JRC happened to obtain court approval for skin-shock treatment for that participant....

## Results

Table 2 shows *M*, *S.D.*, and range of participants' PVNU, NVNU, SAP, and OT percentages during baseline and treatment. Fig. 1, Fig. 2, Fig. 3, Fig. 4 display in graphical form the percentages of these behaviors per 10-s interval for all participants. Graphs are ordered per behavior category and portray the character of the multiple baseline design in which the data were collected.

Data were examined on an individual basis, using visual analysis. Seven clinicians independently judged, for each...

## Discussion

In this study, we addressed the occurrence of potential side effects of CS treatment with a group of nine participants, who showed severe forms of SIB and aggressive behavior. In all behavior categories (i.e., PVNU, NVNU, SAB, and OT) participants either significantly improved, or did not show any change, when the treatment phase was compared to baseline. Negative side effects were not observed. These results are supported by findings of Ball et al. (1975), Linscheid et al. (1994), Linscheid...

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## References (16)

D.E. Williams *et al.*

**A long-term follow-up treatment for severe self-injury**  
Research in Developmental Disabilities (1994)

P.J. Watson *et al.*

**The non-concurrent multiple baseline across-individuals design: An extension of the traditional multiple baseline design**

Journal of Behavior Therapy and Experimental Psychiatry (1981)

R.W. Ricketts *et al.*

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Journal of Behavior Therapy and Experimental Psychiatry (1993)

O.C. Mudford *et al.*

**Therapeutic shock device (TSD): Clinical evaluation with self-injurious behaviors**

Research in Developmental Disabilities (1995)

J.L. Matson *et al.*

**E 20 year review of punishment and alternative methods to treat problem behaviors in developmentally delayed persons**

Research in Developmental Disabilities (1989)

T.R. Linscheid *et al.*

**Multiple factors in the long-term effectiveness of contingent electric shock treatment for self-injurious behavior: A case example**

Research in Developmental Disabilities (2002)

T.R. Linscheid *et al.*

**Positive side effects in the treatment of SIB using the self-injurious behavior inhibiting system (SIBIS): Implications for operant and biochemical explanations of SIB**

Research in Developmental Disabilities (1994)

P.C. Duker *et al.*

**Heart rate and the role of the active receiver during contingent electric shock for severe self-injurious behavior**

Research in Developmental Disabilities (2007)

*There are more references available in the full text version of this article.*

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## Cited by (8)

### Electrical aversion therapy

2016, The Curated Reference Collection in Neuroscience and Biobehavioral Psychology

[Hide abstract](#) ^

Electrical aversion therapy (EAT) is the administration of electrical shocks following exposure to cues that stimulate inappropriate urges or behaviors (respondent conditioning) or following the carrying out of the behaviors (operant conditioning). In addition, EAT is the immediate application of an aversive electrical stimulus following uncalled-for behavior, with the aim of reducing behavior. In 1997, Didden *et al.* found that the response contingent procedure was superior in behavior problems in intellectual disability, compared to other

behavioral therapeutic strategies. The electrical stimulus as an aversive consequence to the behavior makes it possible to exactly link the response and the stimulus. EAT is mostly applied in intellectually disabled or autistic individuals who show severe self-injuring behavior. Since aversion therapy is used to eliminate problematic behaviors and unwanted desires, its uses are more limited than talk therapy and many other types of psychotherapy. Disorders, conditions, and problems for which aversion therapy is most frequently used include drug and alcohol abuse and addiction. Contingent shock is the administration of highly painful electrical shock to subjects immediately following their carrying out of markedly injurious behavior to others or more commonly to themselves, such as eye gouging or finger biting. The other form used levels of shock determined by the subjects to reduce behaviors they found unacceptable, such as compulsive homosexual behaviors, gambling, paraphilic behaviors, and use of alcohol and other substances. This article has detailed EAT-associated problems and limitations.

### Analysis and meta-analysis of single-case designs: An introduction

2014, Journal of School Psychology

[Hide abstract](#) ^

The last 10 years have seen great progress in the analysis and meta-analysis of single-case designs (SCDs). This special issue includes five articles that provide an overview of current work on that topic, including standardized mean difference statistics, multilevel models, Bayesian statistics, and generalized additive models. Each article analyzes a common example across articles and presents syntax or macros for how to do them. These articles are followed by commentaries from single-case design researchers and journal editors. This introduction briefly describes each article and then discusses several issues that must be addressed before we can know what analyses will eventually be best to use in SCD research. These issues include modeling trend, modeling error covariances, computing standardized effect size estimates, assessing statistical power, incorporating more accurate models of outcome distributions, exploring whether Bayesian statistics can improve estimation given the small samples common in SCDs, and the need for annotated syntax and graphical user interfaces that make complex statistics accessible to SCD researchers. The article then discusses reasons why SCD researchers are likely to incorporate statistical analyses into their research more often in the future, including changing expectations and contingencies regarding SCD research from outside SCD communities, changes and diversity within SCD communities, corrections of erroneous beliefs about the relationship between SCD research and statistics, and demonstrations of how statistics can help SCD researchers better meet their goals.

### Self-injurious behavior in people with profound intellectual disabilities: A meta-analysis of single-case studies

2011, Research in Developmental Disabilities

[Hide abstract](#) ^

The limitations people with profound intellectual disabilities experience in functioning contribute to a vulnerability to self-injurious behavior. Since this problem behavior has

important negative consequences for people concerned, examining the effectiveness of treatments is important. In the current meta-analysis, single-case studies investigating non-aversive, non-intrusive forms of reinforcement were combined using hierarchical linear models. This analysis revealed that the average effect of treatment was relatively large and statistically significant. Further, significant variance was observed between both studies and participants. In addition, some evidence was found for a moderator effect of sensory impairment. Finally, no statistically significant moderator effects of medication, motor impairment, setting, age, gender, matching of treatment with behavioral function and contingency were found.

### [Punishment and its putative fallout: A reappraisal](#)

2021, Journal of the Experimental Analysis of Behavior

### [Contingent Electric Shock as a Treatment for Challenging Behavior for People With Intellectual and Developmental Disabilities: Support for the IASSIDD Policy Statement Opposing Its Use](#)

2020, Journal of Policy and Practice in Intellectual Disabilities

### [Revisiting kazdin \(1980\): Contemporary treatment acceptability for problem behavior in children](#)

2013, International Journal of Psychology and Psychological Therapy



[View all citing articles on Scopus](#)

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## **Recommended articles (6)**

Research article

### [Mood Disorders After TBI](#)

Psychiatric Clinics of North America, Volume 37, Issue 1, 2014, pp. 13-29

Research article

### [Correlations among stimuli affect stimulus matching and stimulus liking](#)

Behavioural Processes, Volume 130, 2016, pp. 36-38

[Hide abstract](#) ^

Human subjects were exposed to AB, AC stimulus pairs and then to matching-to-sample tests of stimulus equivalence (B-A, C-A, B-C, C-B) or to a task in which stimulus compounds (BA, CA, BC, CB) were rated for attractiveness. Matching-to-sample tests revealed emergent B-A, C-A, B-C, and C-B choices, replicating previous results in the literature. The mean proportion of correct, emergent choices increased as a function of exposure to the AB, AC

pairs. On the rating task, the liking scores of all stimulus compounds also increased as a function of exposure to the AB, AC pairs. After limited exposure to these pairs, however, the liking scores of the BC and CB compounds were negative. These findings are discussed in relation to perceptual and associative perspectives on the behavioral effects of stimulus correlations.

Research article

## Therapeutic Plasma Exchange for Malignant Refractory Status Epilepticus: A Case Report

Pediatric Neurology, Volume 50, Issue 4, 2014, pp. 407-410

[Hide abstract](#) ^

Refractory status epilepticus is a prolongation of status epilepticus despite anticonvulsant therapy with two or three medications in proper doses; it is defined as malignant status epilepticus if it takes weeks or months. Intravenous immunoglobulin, high-dose steroids, magnesium infusion, pyridoxine, hypothermia, ketogenic diet, electroconvulsive therapy, and surgical therapy are the other treatment options for status epilepticus.

Our 5-year-old male patient was hospitalized at our pediatric intensive care unit because of status epilepticus secondary to meningoencephalitis. No response could be obtained with many medical and nonmedical therapies in our patient, who developed malignant status epilepticus with unknown etiology. Therapeutic plasma exchange was applied as convulsions continued.

Ours is the first child for whom therapeutic plasma exchange was successfully applied because of malignant refractory status epilepticus secondary to meningoencephalitis.

Therapeutic plasma exchange may be a treatment option for children with refractory status epilepticus following presumed meningoencephalitis.

Research article

## Persistence of subsyndromal residual symptoms after remission of major depression in patients without cardiovascular disease may condition maintenance of elevated platelet factor 4 and $\beta$ -thromboglobulin plasma levels

Journal of Affective Disorders, Volume 150, Issue 2, 2013, pp. 664-667

[Hide abstract](#) ^

Depressive patients show a state dependent platelet activation that may heighten their cardiovascular risk, specially when comorbid with Coronary Artery Disease (CAD). We still have little information however on the possibility that residual symptoms that often persist after recovery from a major depressive episode may contribute to drive forward platelet activation, thus extending the exposure to the associated cardiovascular risk.

Nineteen major depressed inpatients treated with electroconvulsive therapy (ECT) were enrolled and tested for platelet aggregation by measuring platelet factor-4 (PF4) and  $\beta$ -



thromboglobulin ( $\beta$ -TG) plasma levels, and for psychometric evaluation by using the 20-item Hamilton Depression Rating Scale (HDRS) and the Symptom Checklist 90 Revised (SCL-90R). Subjects were tested at the beginning of treatment (baseline) and after clinical remission (endpoint).

At baseline the patients showed high HDRS ( $31\pm6$ ) and total SCL-90R ( $200\pm38$ ) scores, followed by a significant decrease at endpoint. However, even if all patients showed full syndromal recovery, SCL-90R "Hostility" and "Psychoticism" subscores showed no significant reduction from baseline, indicating the persistence of subtle residual symptoms. Baseline PF4 and  $\beta$ -TG plasma levels were found remarkably higher and no significant reduction was observed at the endpoint.

Small study population. No follow-up evaluation.

Despite of clinical remission obtained with ECT in patients with major depression, persistence of subsyndromal residual symptoms may contribute to maintain a condition of platelet hyperactivation at the endpoint, increasing their cardiovascular risk and making them more vulnerable to develop cardiovascular disease.

Research article

## [Electroconvulsive therapy and its relationships with clinical characteristics and quality of life in Chinese psychiatric patients](#)

Psychiatry Research, Volume 246, 2016, pp. 246-249

[Hide abstract](#) 

Little is known about the pattern of electroconvulsive therapy (ECT) use in the clinical population in China. This study examined the percentage of ECT use and its association with clinical characteristics and quality of life (QOL) in a psychiatric center in China that caters for a population of 20 million. A total sample of 1364 inpatients was consecutively recruited for the study. Demographic and clinical data including the use of ECT were collected. Psychopathology, activity of daily living and QOL were measured using standardized instruments. The percentage of ECT use was 52.1% in the whole sample; 53.4% in major depression, 57.8% in bipolar disorder, 57.0% in schizophrenia and 32.4% in other diagnoses. There was no significant difference between the ECT and non-ECT groups in any domain of QOL. Multivariate analyses revealed that ECT was independently associated with the diagnoses of major depression, bipolar disorder and schizophrenia, physical restraint, severe aggression, better activity of daily living skills, more frequent use of antipsychotics and less frequent use of benzodiazepines. The percentage of ECT use was much greater in a major psychiatric center in China than those reported from other parts of the world. Use of ECT had no influence on the short-term QOL. Further investigations are warranted to explore the reasons for the high percentage of ECT use.

Research article

## [Clinical and Electrophysiological Effects of D-Serine in a Schizophrenia Patient Positive for Anti-N-Methyl-D-Aspartate Receptor Antibodies](#)



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