

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

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## Abstract

Five individuals, who were treated for severe self-injurious behaviors with contingent electric shock, participated. Hereby, each occurrence of the target response was followed by a remotely administered aversive consequence. Participants' heart rates were compared at times when the active device of the equipment for the above procedure was attached to their body and when the active device was detached. Although typical response patterns emerged across the participants results demonstrated that heart rates were lower when the active device was attached, tentatively supporting the notion that anxiety and stress may be collateral to participants' SIB.

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Meta-analysis has revealed that response-contingent procedures are more effective to decrease problem behaviors than procedures such as antecedent control, noncontingent reinforcement, and psychopharmacology (Didden, Duker, & Korzilius, 1997). Contingent electric shock is a response-contingent treatment option for decreasing severe self-injurious behaviors (SIB) and aggressive behaviors when less intrusive procedures have failed (see e.g., von Heyn, Israel, & Worsham, 1993). Contingent shock attains an effectiveness score that strongly exceeds other response-contingent procedures. However, in spite of its effectiveness (see Duker & Seys, 2000), there is much debate about the use of (electrical) aversive stimuli as a treatment modality. Although it is generally acknowledged that SIB often leads to damages to the

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skin, the eyes, and the brain, professionals are often reluctant to administer painful stimuli in order to decrease severe forms of SIB.

People with SIB for whom treatment is withheld often develop self-restraint (SR). SR refers to the self-imposition of mechanical restraints by, for example, wrapping one's arms in one's clothes, strongly holding other people, clenching objects, etc. SR is often attained and maintained in a compulsive-like manner. Attempts to interrupt SR may evoke strong anxiety reactions and even aggression. There is consensus among researcher that severe SIB, SR, compulsions, and anxiety are often interrelated (King, 1993; Romanczyk, Lockshin, & O'Connor, 1992).

A compelling observation of people who are being administered remotely controlled electrical aversive stimuli is, next to the rapid decrease of SIB and, in many cases, increases of smiling and laughing (Linscheid, Pejeau, Cohen, & Fotoo-Lenz, 1994; Linscheid & Reichenbach, 2002), their eagerness to have the active receiver part of the shock equipment on their body. When the receiver is off their body (e.g., during showering, [un]dressing, preceding and following rest periods in bed) many of these people show signs of anxiety, distress, and other behaviors that are reminiscent of interrupting them in their self-imposition of restraint. However, many of those who oppose against the use of (electrical) aversive stimuli to suppress severe SIB assume that aversive stimuli are threatening and, by consequence, are supposed to induce stress and additional pain on the part of the individual with severe SIB. Also, people may oppose against the above procedure because individuals with lower levels of mental handicap are devoid from the possibility to give their consent to such a treatment.

Due to the improvement of psychophysiological measurement anxiety is no longer an inaccessible hypothetical construct as related to SIB. Heart rate (HR) is a commonly used peripheral indication of anxiety and stress. Continuous recording of HR allows one to observe moment-to-moment changes of this variable in a variety of situations.

In this study, we explore the relationship between anxiety and wearing and nonwearing the active receiver part of the equipment used when a treatment using contingent shock is in effect. Specifically, we recorded HR with five individuals, who were being successfully administered contingent shock for severe SIB, under natural conditions of either wearing the active receiver or not wearing this receiver.

## 1. Method

### 1.1. Participants and setting

Five individuals participated. They all reside at residential facilities in The Netherlands. Participants were randomly selected from a group of individuals ( $n = 52$ ), who are being treated with contingent shock for severe SIB and who are monitored by the first author (see Duker, Vos, Gommers, & Seys, 2002). They functioned at severe levels of mental retardation. During waking hours, each participant's defined target behavior(s) was followed by a remotely administered electric aversive stimulus of 42 mA at 30 or 60 Hz. Simultaneously, a schedule of noncontingent and contingent reinforcement was in effect for each of them as an attempt to establish a repertoire of behaviors that could compete with SIB (e.g., communicative gestures).

Al, a 20-year-old male, showed severe head-banging and head-hitting and was blind due to his previously untreated SIB. Prior to the initiation of contingent shock, that is, 6 years ago, he had been completely mechanically restrained, 24 h per day. Since treatment had started restraints could be removed. Manon is a 19-year-old female, who is diagnosed as deaf and autistic. Eye gouging and head-hitting were suppressed to zero when contingent shock was started, that is, 8 years ago. Melch

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