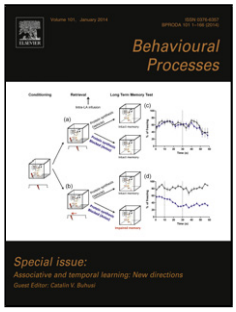

Title: EFFECTS OF PHYSICAL EXERCISE AND SOCIAL ISOLATION ON ANXIETY-RELATED BEHAVIORS IN TWO INBRED RAT STRAINS

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<AT>EFFECTS OF PHYSICAL EXERCISE AND SOCIAL ISOLATION ON ANXIETY-RELATED BEHAVIORS IN TWO INBRED RAT STRAINS

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<ABS-HEAD>Highlights► Physical exercise on a treadmill reduced anxiety-like behavior ► Spontaneous activity levels are genotype-dependent ► Benefits of physical exercise depend on the type of exercise performed

<ABS-HEAD>Abstract

<ABS-P>We investigated the effects of physical exercise (PE) on locomotor activity and anxiety-like behavior in Lewis (LEW) and Spontaneously Hypertensive Rats (SHR) male rats. Rats received either four weeks of forced training, 5 days/week, on a treadmill (experiment 1) or were given 21 days of free access to running wheels (experiment 2). We also tested the effects of social isolation (SI) (seven days of isolation - experiment 3) on behavior. In experiment 1, 20% of LEW rats and 63% of SHR rats completed the training protocol. PE significantly increased central and peripheral locomotion in the open field (OF) and entries into the open arms in the elevated plus-maze (EPM) in both strains. In experiment 2, the distance traveled by SHR rats on running wheels was significantly higher compared with LEW rats. PE on running wheels also increased the time spent in the center of the OF in SHR rats only. In experiment 3, SI decreased central and peripheral locomotion in the OF in both strains. In summary, forced PE on a treadmill reduced anxiety-like behavior and increased locomotion in male rats of both strains, whereas voluntary PE on running wheels decreased anxiety-like behavior in SHR rats only. SI decreased locomotion in both strains in the OF. This study suggests that spontaneous activity levels are genotype-dependent and the effects of PE depend on the type of exercise performed.
<KWD>Keywords: treadmill; running wheels; elevated plus-maze; open field.

<H1>1. Introduction

A growing body of evidence indicates the positive influence that lifestyle factors, including physical exercise (PE), social interaction and nutrition, can have on emotionality in humans (Kramer et al., 1985; Fox, 1999; Ratey & Loehr, 2011; Hötting & Röder, 2013). For example, periodic PE decreases anxiety, improves mood, physical well-being and mental disposition (McKercher et al., 2009; Samulski et al., 2009; UNESCO, 2013). It also may have a positive influence on the modulation of brain neurotransmitter systems (Hill et al., 2010), related to