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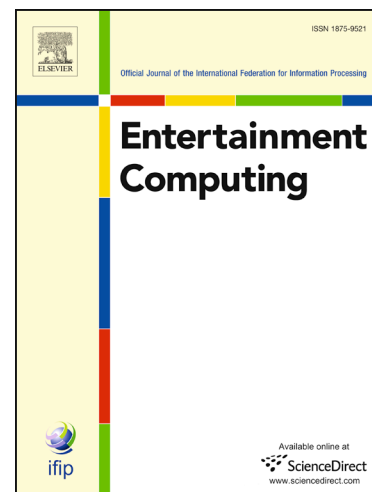
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# Use of Virtual Reality technologies as an Action-Cue Exposure Therapy for truck drivers suffering from Post-Traumatic Stress Disorder

Bob-Antoine J. Menelas<sup>a</sup>, Corentin Haidon<sup>a</sup>, Adrien Ecrepont<sup>a</sup>, Benoit Girard<sup>b</sup>

<sup>a</sup>University of Quebec at Chicoutimi, 555 blv universite, Chicoutimi, G7J 4Z7, Quebec, Canada

<sup>b</sup>La Futaie: Therapy center, 1061, boulevard Tadoussac, Saint-Fulgence, G0V 1S0, Quebec, Canada

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## Abstract

This work describes a truck-driving simulator designed for the care of truckers suffering from post-traumatic stress disorder (PTSD). This simulator exploits a new approach using virtual reality (VR) technologies in the treatment of PTSD. Indeed, we exploit full capabilities of VR technologies to not only expose the user to the frightening stimuli but also to allow him to be active in this environment that may contain anxiety-provoking stimuli. These two aspects are supported throughout a gamification process where the game mechanics are mapped to the expected learning mechanics. Moreover, the developed simulator is fully customizable. Two truck drivers suffering from PTSD have experimented it. The intervention allowed a desensitization and a verbalization of fears associated to the past trauma.

*Keywords:* PTSD; ACET; Exposure Therapy, Truck accident; Virtual Reality, Truck simulator

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## 1. Introduction

As related by the American Truck Association: the trucking industry is the centerpiece of the U.S. economy [1]. The 2012 Commodity Flow Survey data shows indeed that trucking carries more than seventy percent of the US freight [2]. Doing so, truck drivers do deliver 71,3% of the total weight of US freight, 71% of the market value. These observations explained why in 2013, although large trucks represent only 4 percent of all registered vehicles, they account for 9% of all the mileage traveled [3].

However, when analyzing the characteristics of the work of a trucker, several factors that may impact his psychological health, emerge. Some factors may be intrinsic while others are extrinsic to the truck driver [4, 5]. The first category groups all issues having a direct link with the working environment. This includes the feeling of discomfort or even the insecurity due to ignorance of a trip, a night driving, feeling nervous because of a heavy and/or undisciplined traffic. The stress due to the weather, the breakage, the nature of the cargo (often dangerous) are also professional conditions that may affect his health [6]. Regarding extrinsic factors that may negatively impact the mental health of a trucker, one counts the remoteness of the family, physical health weakened by a lack of physical exercise, fatigue and loneliness. All this seems to create an environment conducive to accidents [7, 8].

Above reasons explained why in 2013, it has been observed that large trucks represented 9 percent of vehicles involved in fatal crashes. This percentage drops to only 3 percent when one considers crashes having only injuries and/or property-damages. Two important facts have to be retained regarding vehicles crashes. First, large trucks were more likely to be involved in fatal multiple-vehicle crashes. Second, in fatal crashes, only 17% of the victims were occupants of large trucks. With these observations, it appears that most of truck drivers who had an accident are likely

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