Commentary: One way attention-deficit/hyperactivity disorder can be life threatening? A travelogue on Nikolas et al. (2016)

Russell A. Barkley
Departments of Psychiatry and Pediatrics, Medical University of South Carolina, Mount Pleasant, SC, USA

I am grateful for the opportunity to provide a brief commentary on the brilliant study of Nikolas et al. (2016) concerning risky bicyclist-automobile behavior in ADHD and typical youth. The sophistication of the simulator and procedures and the number and precision of measurements are remarkable and afford us an excellent glimpse into the specific mechanisms by which previously documented injury risk in such natural settings may be increased by ADHD in youth. My kudos to the investigators for conducting such a complex, yet illuminating study. Having conducted driving simulation research on teens and adults with ADHD that extended the well-substantiated risks the disorder creates in that related domain (Barkley, 2015), I can attest to the numerous difficulties and limitations posed by such research. I also recognize the unique opportunity simulators provide to help better understand more precisely the cognitive-behavioral parameters that contribute to the well-documented injury risks posed by this disorder.

While my purpose here is not to engage in a methodological critique of the study or waste space summarizing its findings, I should note for future researchers an issue in using simulators. That issue as found in ours’ and others’ research is that direct behavioral observations of the individual performances in such settings can yield even more useful information about the nature of and reasons for the risks than can just the numerical outputs from the simulator itself. And such ratings are more highly correlated with (and hence predictive of) such risks in natural settings than are such simulator outputs. Future research should consider employing such observations.

I also will briefly note here clinically important implications of these and other research results on accident risk in ADHD. As shown by Nikolas et al., ADHD can be a life threatening disorder under some circumstances. Prior research suggests that it leads to a three fold greater risk of untimely death by midlife, and may well shorten life expectancy. That is because of the injury and other risks linked to it along with low conscientiousness (among the best predictors of human health risks and life expectancy) and numerous other adverse health outcomes affecting longevity and related to the condition (Barkley, 2015; Nigg, 2013).

Nikolas et al. nicely replicate and extend the existing evidence of risk that ADHD poses for youth in geographic areas with motor vehicle traffic, especially high density ones. Such risk was found earlier in both pedestrian-auto and bicycle-auto encounters. While this study did not find a greater rate of collisions in the ADHD group, the figure of 16% for both groups for being hit at high-density intersections was startling and sobering. If true, not only does this risk occur in 1 of every 7 such encounters in natural settings in the lives of these youth, but over time the deficits shown in the ADHD group in both entry timing and motor execution of the crossing would seem to guarantee a greater injury risk to that group given enough opportunity exposures in real life.

Important to note as well was their findings that each ADHD symptom dimension contributed separable yet interacting problems for crossing safety; findings that have also been evident in vehicular driving research on ADHD. In that research, inhibitory deficits and emotional dysregulation seem to contribute to vehicular risk-taking, excessive speeding episodes, road rage, and driving under the influence of alcohol. In contrast, inattention symptoms are related to in-vehicle distractibility and so crash risk (Barkley, 2015). As Nikolas et al. noted, these specific cognitive-behavioral risk mechanisms are likely part of the larger domain of executive dysfunctioning and delay aversion inherent in ADHD (see Willcutt chapter in Barkley, 2015).

Moreover, in-vehicle video recordings of ADHD driver behavior being collected by Cox and colleagues at the University of Virginia Medical School offer literally hair-raising observations of the types of risks taken and adverse consequences experienced by ADHD drivers in natural settings. Those findings are implying that the risks posed by ADHD in natural settings when drivers are outside of human observation may be far greater than simulator results suggest. This leads one to naturally wonder if the same may well be true in child bicyclist-auto encounters among ADHD youth. And it also suggests that using GoPro style digital cameras atop cyclists helmets to capture recordings in natural settings on samples such as those used here may reveal similar increased risk-taking outside of adult supervision.
As noted by Nikolas et al., youth with ADHD are at considerably higher risks for accidental injuries of all types from broken teeth, lacerations, and broken bones to closed head trauma, poisonings, and burns, among others (Barkley, 2015; Nigg, 2013). That risk seems to be partially mediated by not only ADHD symptom dimensions but also motor coordination deficits as implied here. And it is also mediated by comorbidity with other externalizing disorders, especially oppositional defiant disorder (ODD). Reduced parental monitoring of children’s activities is also a factor identified in some studies. Given that parental ADHD is more likely to exist in the parents of children with ADHD, and that parental ADHD is known to reduce such monitoring (see Johnston & Chronis-Tuscano chapter in Barkley, 2015), are both of these parental factors further contributing to cycling-auto or pedestrian-auto risks in natural settings for ADHD youth? Moreover, since ODD is 11 times more likely to exist in ADHD youth, is it also a factor in determining these risks? Such questions deserve consideration in future studies of the risks posed by the disorder in these activities.

The findings of Nikolas et al. may also be pertinent to understanding a related domain of young adult activities—using motorcycles. Past research shows that individuals experiencing motorcycle injuries are more likely to have ADHD (Safiri et al., 2013), that motor cycle delivery boys are also more likely to have ADHD (Kieling et al., 2011), that having ADHD leads to more accidents and injuries in the latter circumstance, and that ADHD youth are more likely to engage in motorsports that pose heightened risk for both unsafe driving and driving-related injuries (Wymba et al., 2013). It is very likely that the problems identified here for ADHD youth while bicycling might well extend into those higher risk motorcycling activities and thus create greater injury risk among older ADHD teens and young adults.

The cognitive-behavioral problems identified here for ADHD youth may help to guide future efforts at risk prevention. The authors suggest that additional training on traffic gap entry timing for ADHD youth cyclists might be one such recommendation. Perhaps, but skill training alone when done for other ADHD-related problems, such as social skills or self-regulation, and conducted outside of natural settings where the problems and risks arise and if done by adults who are not natural caregivers has had little success (see Mikami chapter in Barkley, 2015). In part this may have to do with the fact that ADHD seems to involve more of a problem with performance (doing what one knows in natural settings when it would be useful to do so) than with knowing what to do. And so beyond the commonsense and quite reasonable suggestion of Nikolas et al., clinicians should also counsel and forewarn families of children newly diagnosed with ADHD about injury risk generally and cycling and driving risks specifically at the ages when such activities become available.

Further, recommending closer supervision by parents and others of those activities seems reasonable as does giving ADHD youth a more graduated exposure to cycling and driving in natural settings. The use of ADHD medications while engaging in those activities is also a reasonable clinical implication from these and other results pertaining to this topic. The latter treatment is especially appealing because it has been shown to decrease general accidental injury risks in ADHD youth by 31-43% over untreated ADHD population risks by ages 10–12 years (Dalsgaard, Leckman, Mortensen, Nielsen, & Simonsen, 2015). It has also improved the driving performance of ADHD teens and young adults (Biederman et al., 2012). And it can operate when parents or others cannot supervise the independent bicycling (or driving) of these youth. So perhaps it might do much the same for bicyclist-auto encounters in ADHD youth. Undoubtedly, a package of interventions seems likely to be what is needed to reduce risk in these domains.

Acknowledgements
R.A.B. receives royalties from Guilford Press for his books, clinical manuals, DVDs, newsletter, and rating scales related to ADHD, executive functioning, and impairment; he also receives royalties from PESI, ContinuingEdCourse.com, and PsychContinuingEd.com for his Internet CE courses on ADHD and related topics for professionals; he has also been a paid speaker for Eli Lilly (China) on ADHD and executive functioning in 2015 and is a paid consultant to Ironshore Pharmaceutical & Development, Inc. He has declared no additional competing or potential conflicts of interest in relation to this Commentary article, invited by the Editors of JCPP (which has undergone internal peer-review).

Correspondence
Russell A. Barkley, Departments of Psychiatry and Pediatrics, Medical University of South Carolina, 2720 Fountainhead Way, Mount Pleasant, SC 29466, USA; Email: drbarkley6769@comcast.net

References


Accepted for publication: 4 December 2015