EDITORIAL COMMENT
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Pathological Internet Use, Aggression, and Cyberbullying in Children and Adolescents With Attention Deficit Hyperactivity Disorder - Editorial Comment

The purpose of the study by Yasin et al[1] was to assess the relationship between pathological internet use, aggression, and cyberbullying in children and adolescents diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). It was thought to help identify factors that increase the risk of victimization of individuals with ADHD. The study found a median of 14 hours/week duration of internet use in the ADHD group, i.e. double that in the control group, a 1 SD higher internet addiction score, and a 0.61 correlation between internet use and internet addiction score, only in the ADHD group. Also, many more participants in the ADHD group reported being cyberbullied at least once (43% vs 13%), but there was no significant difference in the rate of self-reported active cyberbullying. Finally, the median parent-reported aggression score was four times as high in the ADHD group than in the healthy control group, but it was not systematically related to self-reported cyberbullying or cyber victimization.

The finding of higher risk of (pathological) internet use and –addiction as well as higher levels of cyber-victimization do not come as a surprise. However, the study did not find many meaningful associations indicating (modifiable) factors of risk. For example, the finding that the ADHD group was three times more often cyberbullied than the control group might be due to their substantially longer duration of internet use, but the association between cyber-victimization and internet use duration was not significant. Also, cyberbullying and –victimization were not explained by participants' aggression. Then, was it justified to expect higher risk *and* clarifying associations, and why did the study not find the latter?

First, children and adolescents with ADHD may be expected to show higher levels of (pathological) internet use. Although they often present themselves as having many friends, the reality is that they are much more often rejected by their peers than other children. Internet gives them a safe haven, both for entertainment and social interaction. Moreover, the direct feedback they get from internet interaction may keep them engaged – more than many other tasks – which may make them use the internet more often than other youths. One remarkable finding from this study is that the parents of youth with ADHD *less* often set rules for internet use (although it was not quite clear how parent and youth reports on this question were combined). Rules for internet use were set 67% more often by parents of the healthy controls than by parents of youths with ADHD. Part of elevated duration of internet use may be explained by this difference. But there is more. Parents of children with ADHD also reported much more aggression in their children than parents of other control children, despite the absence of comorbid diagnoses in the externalizing spectrum. Limit-setting seems to be difficult with these children. Importantly, a recent study by Pascual-Sanchez et al[2] reported that positive parenting significantly protected against cyberbullying involvement. Inconsistent discipline was associated with being a cyberbully, while lower levels of monitoring were associated with being a cyberbully and a cyberbully-victim. So, here is one potential modifiable factor in the study, but its association with outcomes were not tested.

Second, ADHD symptoms are consistently associated with physical aggression and account for the association between physical aggression and victimization[3-5] in group settings. So, it is remarkable that this study hardly found associations between aggression and cyber-bullying, or victimization. But did this study really tap what happened during these youths' internet use? Internet use and experiences were reported by youths themselves, while aggression

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was reported by parents. And we know that parent reports and adolescent self-reports on externalizing behavior do have little agreement. Moreover, to tap the youth's internet use and experiences a self-report screening scale was used of which it is not clear to what extent it reflects actual behavior. And given their difficulty in estimating implications of their behaviors, youths with ADHD may not be aware of their behavior, don't see their behavior as bullying, or regard their behavior as justified (and thus not as bullying behavior.

To really tap the propensity of youth with ADHD for cyber-bullying and –victimization we'd rather use an experimental set-up. For example, Thomaes et al[6] conducted a shame inducing experiment to test how self-views influence shame-induced aggression. Young adolescents completed measures of narcissism and self-esteem. They lost to an ostensible opponent on a competitive task. In the shame condition, they were told that their opponent was bad, and they saw their own name at the bottom of a ranking list. In the control condition, they were told nothing about their opponent and did not see a ranking list. Next, participants could blast their opponent with noise (aggression measure). As expected, narcissistic children were more aggressive than others, but only after they had been shamed. By analogy, this set-up might work to elicit internet social responses in youth with ADHD. Even without comorbid diagnosis, youth with ADHD may experience more problems in interaction with peers and adults, experience rejection, potentially leading to a low or inflated, vulnerable self-image. Moreover, we know that peer rejection tends to be substantially stable, unless countered by prosocial actions,[7] heightening the sensitivity to rejection. A functional Magnetic Resonance Imaging (fMRI) study[8] examined subjective and neural responses to social exclusion in adolescents (age 12-15) who either had a stable accepted or a chronic rejected status among peers from age 6 to 12. Both groups of adolescents reported similar increases in distress after being excluded in a virtual ball-tossing game (Cyberball), but adolescents with a history of chronic peer rejection showed higher activity in brain regions previously linked to the detection of, and the distress caused by, social exclusion. Imaged neural responses also showed that the chronically rejected group had much more difficulties controlling the urge to retaliate after exclusion.[9] It might be this type of processes that need to be tapped in order to elucidate what happens to youths with ADHD when they enter social encounters on the internet. Needless to say we need studies tapping these processes real-time.

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