**Yes, smartphone addiction does harm your teen's mental health**

Published Saturday 2 December 2017 By Maria Cohut

To all parents who were ever concerned about their teenage son's or daughter's addiction to their smartphone: you have serious grounds for worry, a new study suggests.

A new study suggests that smartphones do put teenagers at risk when it comes to mental health.

Is your teenager glued to their phone? Are they always online, checking social media, or looking at cat and bunny videos? Well, researchers from the Korea University in Seoul, South Korea, say you have grounds to worry.

A consumer survey carried out this year found that 82 percent of Americans own or can use a smartphone, 92 percent are likely to use it while shopping, 78 while eating at home, and 44 while crossing the street. Moreover, according to a Pew Research Center survey, 73 percent of teens have access to a smartphone, and 92 percent of them say that they go online every single day.

Dr. Hyung Suk Seo, of Korea University, warns that there's more danger in this addiction than just the potential of wasting a lot of time sharing memes and viral videos. In fact, teens who are addicted to their phones and the Internet have a chemical imbalance in their brains that predisposes them to depression and anxiety. The researchers presented the results of their study at the annual meeting of the Radiological Society of North America, held in Chicago, IL.

Addicted teens more likely to be depressed

Dr. Seo and team worked with 19 adolescents — aged 15.5 years old, on average — comprising nine males and 10 females who had been previously diagnosed with smartphone or Internet addiction.These were matched for biological gender and age with other 19 participants without smartphone addiction (the controls). The participants' brains were examined using magnetic resonance spectroscopy (MRS), which is a technique that allows researchers to evaluate levels of various chemicals in the brain. Of the 19 smartphone- and Internet-addicted teens, 12 also received cognitive behavioral therapy (CBT) over 9 weeks as part of the study. The CBT type that they received was adapted from a program targeting gaming addiction.

To evaluate just how serious the participants' addictions were, the researchers used standardized tests focusing on the extent to which smartphone and Internet use impacted the performance of daily activities, harming productivity and social life, as well as sleep and mental health.

"The higher the score [on these tests]," explains Dr. Seo, "the more severe the addiction."

Participants with a more severe Internet and smartphone addiction were also found to have problems with depression and anxiety, as well as sleeplessness and impulsive behavior.

Chemical imbalances in the brain revealed

The addicted teens underwent MRS both before and after CBT, while the control group was only examined using MRS once. The researchers were interested in measuring levels of gamma aminobutyric acid (GABA) and glutamate-glutamine (Glx) in the brain.

GABA is an inhibitory neurotransmitter that interacts with neural synapses, slowing down signaling between brain cells. GABA balances out the effect of Glx, which is an excitatory neurotransmitter that speeds up electric signaling in the brain. Imbalances in GABA and Glx levels have previously been found to play a role in mood disorders such as depression and anxiety.

Following the MRS exams, the team found that addicted participants, in comparison with the healthy control group, had a higher ratio of GABA to Glx before CBT in the anterior cingulate cortex area of the brain, which is implicated in cognition and the regulation of emotions.

Chemical balance, however, was largely restored in the brain following CBT interventions.

Dr. Seo explains that ratios of GABA to Glx and GABA to creatine — a natural substance that plays a role in emotional regulation and cognitive ability, among others — are significantly linked to the severity of smartphone and Internet addiction, as well as with the development of anxiety and depression.

The researcher hypothesizes that GABA levels in the anterior cingulate cortices of youths with a smartphone or Internet addiction could be associated with damaged cognitive and emotional processing in the brain. Still, this idea is yet to be confirmed by further clinical studies.

In the meantime, Dr. Seo and team's findings should inspire us to revise our relationship with technology and set a healthy example for younger users.