

Process Addictions: Brain Chemistry Correlates to Chemical Dependencies

An Interview with Dr. Darryl S. Inaba, PharmD, CATC-V, CADC III

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This column's question on process addictions were submitted by *Advances in Addiction & Recovery* readers. Submit your questions for Dr. Inaba to jgleason@naadac.org.

NAADAC: Why was problem and pathological gambling moved from being an Impulse Control Disorder in the DSM-IV to a Substance-Related and Addictive Disorder in the DSM-5 and will other impulse control behaviors be reclassified as addictions in the future?

DR. INABA: In 2013, gambling though a behavioral process, was fully accepted as an addiction similar to that seen in chemical dependency because brain imaging and other research showed that the 0.4 to 1.0% of U.S. gamblers who developed gambling disorder¹ had brain chemical and functional anomalies similar to that seen in drug addictions and especially as that seen with stimulant (methamphetamine or cocaine) use disorders.^{2,3,4} Process Addictions are addictions to processes, activities or behaviors such as gambling, internet use, sex/pornography, eating, romance, even work and possibly many other behaviors where over-involvement and compulsivity with the activity is continued despite the development of severe life consequences.⁵ Studies on the wide diversity of eating disorders from anorexia/bulimia nervosa to binge-eating and compulsive over-eating are also showing brain anomalies associated with addiction to substances that should result in their being redefined as substance-related and addictive disorders in the near future.^{6,7,8,9} Internet, romantic love, and sex addiction are also being studied^{10,11,12,13} and should be included in the future as well. Shopping (really buying), arson, kleptomania, et al. are not being studied as much but I feel that they are also part of this class of psychiatric conditions known as substance-related and addictive disorders and may be included as such in the future when brain imaging and chemistry studies are able to provide convincing evidence that they disrupt vulnerable brains in the same way that addictive substance impact the brain.

NAADAC: Are brain chemical (neurotransmitter) anomalies present in process or behavioral addictions (i.e. gambling, shopping, food, relationships, internet) similar to those that are seen with chemical dependencies like methamphetamine or opiate addiction?

DR. INABA: Process addictions like chemical addictions involve a greater action of the neurotransmitter dopamine in the mesolimbic brain pathway associated with incentive and motivation. I refer to this as the beginning of the brain's Addiction Pathway where dopamine is released by the Ventral Tegmental Area (VTA) to activate the brain's survival instincts in the Nucleus Accumbens Septi (NAc), the "go switch".¹⁴ This dopamine connection has been confirmed for all addictive substances and now confirmed in pathological gamblers during a gambling episode when they are engrossed in their wagering behavior.^{15,16,17} The initial activation of this pathway in an individual that is vulnerable to gambling addiction results in much greater NAc activity encouraging more participation in

the activity which is mistaken as being necessary for their survival. This is exactly what happens when a person vulnerable to a chemical addiction is exposed to a drug. Excessive dopamine release ultimately leads to its depletion in the addiction pathway bringing about the craving and obsession to reactivate its activity in any way possible and as soon as possible. The behaviors that result from this process are observed as addiction regardless of what activates it, either a substance or an activity like eating, internet, or gambling. The other major brain circuit of the addiction pathway is the control circuitry located in the frontal cortex of the brain. Dopamine also



activates this part of the pathway but either has less ability to do so or the control circuit disconnected to the NAc “go switch” in those vulnerable to addiction. The control circuitry of the brain communicates its “stop” message through the neurotransmitters glutamate. Recent studies have looked at targeting this brain chemical to treat addictions including pathological gambling.¹⁸ Other neurotransmitters involved with addiction in the brain’s addiction pathway are norepinephrine, endorphins and GABA. Endorphins facilitates the function of saliency providing greater prominence of addiction related brain processes over other processes and GABA is often involved in the withdrawal and craving processes of addiction. Lower levels of norepinephrine transporters in the brain have especially been linked to pathological gambling. These individuals are less bothered by losing than others with normal levels of such transporters and therefore continue to gamble despite horrible losses.¹⁹

Process addictions like gambling have the same downward spiraling pattern of life dysfunctions that addiction to drugs induces. They can ultimately result in catastrophic life consequences if unaddressed and not managed. Gambling, internet, eating and other process addictions need to be rigorously addressed to help minimize the impact they have on those

who are vulnerable to such disorders. The good news is that process addictions are now being taken much more seriously and there are treatments in development to address the wide diversity of such addictions. Peer support groups are also evolving to encourage a better understanding and acceptance that these are actual biologic processes. Groups like Gambling Anonymous, Overeating Anonymous, Emotions Anonymous, Internet & Tech Addiction Anonymous, etc. provide fellowship and hope that process addictions can be treated and managed by those who accept their vulnerability and participate in treatment.



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(Endnotes)

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