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Wednesday, November 17, 2004

Dear Senator Brownback, Honorable Members of the Committee:

It has always seemed self-evident that pornography is nothing more than a form of "expression." Its putative merits, lack thereof, or evils always therefore have been debated in terms appropriate to "expression," and our laws reflect as much. We argue over the "morality" of pornographic literature; its nature as "high" or "low" art; whether it has any "redeeming value." References to "works" of pornographic "literature" and "acts" of pornographic "dance" are enshrined at the highest levels of American constitutional jurisprudence—the words in quotation marks making it clear that the understanding of pornography as expression is foundational and unquestioned.

Senator, distinguished members, I respectfully submit to this committee that modern science allows us to see that this is an illusion: Pornography is mere "expression" only in the trivial sense that a fall from the Empire State building is a mere stumble—since it's hitting the ground that's fatal. Or, that cigarettes don't cause cancer, it's the burning smoke that's the problem.

Here is what I mean: Like cigarettes, that particular form of expression we call pornography, unlike all other forms of expression, *is a delivery system that has a distinct and powerful effect upon the human brain and nervous system.* Exactly like cigarettes, and unlike any other form of expression, this effect is to cause a powerful addiction. Like any other addiction, the addiction is both to the delivery system itself—the pornography—and to the chemicals that the delivery system delivers.

It may seem surprising that, at this juncture, I should speak of "chemicals", when one might be thinking instead of "sex." But, in fact, modern science allows us to understand that the underlying nature of an addiction to pornography is chemically nearly identical to a heroin addiction: Only the delivery system is different, and the sequence of steps. That is why heroin addicts in particular give up sex and routinely compare their "rushes" to "orgasms".

The chemistry involved is as follows: Upon viewing or reading the "expression", the pornography addict experiences an irresistible impulse to self-stimulation. Not so upon reading Melville, or Batman or *The Washington Post.* For the addict, this impulse has become more intense from pornography than from people he loves or who love him, and also requires ever more extreme forms of pornographic expression to achieve the same level of pleasure. Upon achieving climax, the brain releases opioids—chemicals that are the naturally occurring analogs to synthetic opiates such as morphine or heroin. It is to ever higher levels of these

opioids that the pornography addict has become addicted in tandem with the delivery system that ensures their release. Indeed, he—and today, with the internet, in ever increasing numbers, she—has become part of that delivery system—along with the pornographic "expression" itself. The pornography addict soon forgets about everything and everyone else in favor of an every more elusive sexual jolt. He will eventually be able to find it only among other "junkies" like himself, and he will place at risk his career, his friends, his family. He will indulge his habit anywhere and everywhere, at any time. No one, no matter how highly placed, is immune. And like all other addicts, the pornography addict will lie to cover it up, heedless of risk or cost to himself or to others.

In the year 2000, ABC-NEWS.com cooperated with the journal CyberPsychology & Behavior in a survey of 17,251 individuals. They found that 6% of those surveyed met formal criteria for a full-fledged internet pornography addiction. Another survey found that 41% of corporations had disciplined or terminated employees within the previous year because of severe problems with internet pornography. The next largest problem was chat rooms at 12%--and many of these involved sexual chat. All other internet problems were much less consequential, and at lower percentages, even gambling. These studies are but the mere tip of an ever growing iceberg.

Senators, honorable members, it was once possible with sincerity and rigor to maintain that pornographic expression had to be considered on the same abstract and elevated plane as any other form of expression, and that to do otherwise would gravely harm the foundation of our freedoms. It is no longer possible to do so without turning a blind eye to the plain evidence of neurophysiology and epidemiology. Like all forms of expression (and a great many other things) it is even more broadly speaking a kind of "stimulus". And it is as a stimulus of a most distinct sort that its operational effects can be best understood. These effects are "tuned" as it were, to the deepest and oldest biological impulses of human beings as physical organisms driven to survive via the reproductive act. Hence, the most intense pleasurable reinforcement is associated with sexual stimulation. Certain kinds of synthetic stimulation, properly designed and rapidly delivered can act just as effectively as physical stimuli upon the chemical-releasing centers in the brain (and elsewhere in the body); as effectively and immediately as though one had inserted an electrical probe into the brain, or a needle into the arm.

With advent of the computer, the delivery system for this addictive stimulus has become nearly resistance-free. It is as though we have devised a form of heroin 100 times more powerful than before, usable in the privacy of one's own home and injected directly to the brain through the eyes. It's now available in unlimited supply via a self-replicating distribution network, glorified as art and protected by the Constitution.

I will be glad to provide you and your colleagues with additional information and documentation.

Sincerely,

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Additional Comments and Supporting Materials

From *Science,* 2001: [S]cientists have traditionally confined their use of the term to substances--namely alcohol and other drugs--that clearly foster physical dependence in the user. That's changing, however. New knowledge about the brain's reward system, much gained by super refined brain scan technology, suggests that as far as the brain is concerned, a reward's a reward, regardless of whether it comes from a chemical or an experience. And where there's a reward, there's the risk of the vulnerable brain getting trapped in a compulsion. "Over the past 6 months, more and more people have been thinking that, contrary to earlier views, there is commonality between substance addictions and other compulsions," says Alan Leshner, head of the National Institute on Drug Abuse (NIDA) and incoming executive officer of the American Association for the Advancement of Science, publisher of *Science.* ... **[says]** Howard Shaffer, who heads the Division on Addictions at Harvard. "...a lot of addiction is the result of experience ... repetitive, high-emotion, high-frequency experience. But it's become clear that neuroadaptation—that is, changes in neural circuitry that help perpetuate the behavior—occurs even in the absence of drug-taking." "Addiction occurs when a habit hijacks brain circuits that evolved to reward survival-enhancing behavior such as eating and sex," according to this article in *Science* 294, 980-982. "It stands to reason if you can derange these circuits with pharmacology, you can do it with natural rewards too," observes Stanford University psychologist Brian Knutson. Thus, drugs are no longer at the heart of the matter. "What is coming up fast as being the central core issue ... is continued engagement in self-destructive behavior despite adverse consequences," says Steven Grant of NIDA.

As reported in the British medical journal *Lancet* (Vol 364 July 31, 2004) Jenizbek Nazarilez, M.D., has had remarkable success—nearly 90%—in reversing severe opiate, cocaine and alcohol addictions in Central Asia by using an extraordinarily aggressive form of coma-inducing treatment based on the assumption that "...addiction has inhibited the production of endorphins." UN Secretary-General Kofi Annan, California Governor, Arnold Schwarzenegger, and the Dalai Lama have all pledged their support. Over 17,000 individuals have undergone treatment so far. The evidence is not only of critical importance with respect to drug treatment proper, but provides indirect evidence that the common neurochemical denominator of all addictions is opioid, placing the sexual addictions squarely at the center of interest and concern.

"...the impact of the opioid system for psychiatric disorders ... especially with regard to affective disorders and addiction...work in this area continued successfully". (See Falk Kiefer, Mirko Horntrich , Holger Jahn and Klaus Wiedemann, Is withdrawal-induced anxiety in alcoholism based on b-endorphin deficiency? *Psychopharmacology* (2002) 162:433–437). The intensity of alcohol withdrawal is

related to extent of endorphin depletion. To the extent that sex- and pornography addicts become endorphin-depleted; and that addictions tend to be multiple (alcohol, drug, sex and pornographic addictions are frequently found in combination; sex and alcohol binges come in tandem), the intensity of alcohol withdrawal and associated cravings may be expected to be increased by the pornography addiction and vice versa. Multiple addictions are neurophysiologically entangled and mutually reinforcing as they share a common chemical pathway.

The ready availability of internet pornography has made the progression from choice to habit to compulsion to overt addiction with destructive real-world consequences stark and inarguable. Furthermore, earlier delivery systems for pornography involved sufficient "friction" — effort; time between initiation of action and imprinting of the imagery in the nervous system; capacity to swiftly enough tune the imagery to the specific sensitivities of the recipient — that the barriers were on a statistical basis too high for most women. On a statistical basis, addiction to pornography was therefore overwhelmingly found among men and boys. With the advent of internet pornography, however, this friction has been drastically lowered. As a result, there has been an almost immediate and dramatic increase in the number of women who have been tracked as following the same sequence from choice to habit to overt addiction, including women with no prior involvement in sado-masochism who became addicted to it through internet pornography that eventually led to overt extra-marital engagements. "Some respondents described a rapid progression of a previously existing compulsive sexual behavior problem whereas others had no history of sexual addiction but became rapidly involved in an escalating pattern of compulsive cybersex use...Adverse consequences included...harm done to their marriage...exposure of children to online pornography or masturbation, career loss,...legal consequences." (Jennifer Schneider, A Qualitative Study of Cybersex Participants: Gender Differences, Recovery Issues and Implications for Therapists. *Sexual Addiction and Compulsivity* 7:249-278 (2000)

So well understood is the relation of the endorphin system to pleasure, that a device to directly stimulate release is being tested by the Russians and by University of Texas, Southwestern Medical School: Devices for Noninvasive Transcranial Electrostimulation of the Brain Endorphinergic System: Application for Improvement of Human Psycho-Physiological Status, Valery P. Lebedev, A.V. Malygin, A.V. Kovalevski, S.V. Rychkova, V.N. Sisoev, S.P. Kropotov, E.M. Krupitski, L.I. Gerasimova, D.V. Glukhov, and G.P. Kozlowski. *Artificial Organs,* 26(3):248–251 (2002) Blackwell Publishing, Inc.

The brain effect of pornographic imagery versus non-pornographic imagery is instant and immediately identifiable and differentiable between men and women. "SEEN IT!" - EFFECTS OF STIMULUS SEQUENCE ON EMOTIONAL

PICTURE PERCEPTION, Tobias Flaisch, Markus Junghoefer, University of Konstanz; Margaret M. Bradley, University of Florida; Harald Schupp, University of Konstanz; and Peter J. Lang, University of Florida. Poster Presentation on fMRI imaging of differential brain effects of rapid pornographic images in males and females. Society for Psychophysiological Research 44th Annual Meeting, October 20-24, 2004, La Fonda Hotel, Santa Fe, New Mexico, Poster Session I, Main Floor Sweeney Convention Center, Thursday, October 21, 8:00 p.m.-10:00 p.m.; also *Human Brain Mapping* 16:1–13(2002) using Quantitative EEG and Nature *Neuroscience* 7:4,411-416 (March, 2004) using fMRI.

fMRI Imaging shows that in addictive states, even *craving* is associated with distinct brain states in the addict (Am J Psychiatry 158:7, July 2001; Am J Psychiatry 2001; 158:86–95), in that part of the brain called the amygdala. Recall that the craving state is associated with endorphin depletion, and endorphins are the chemical pre-eminently associated with orgasm. Other studies show similar changes associated with both alcohol and other addictive cravings as well, unsurprisingly.( Effect of experimenter-delivered and self-administered cocaine on extracellular b-endorphin levels in the nucleus accumbens, I. Roth-Deri, A. Zangen, M. Aleli, R. G. Goelman, G. Pelled, R. Nakash, I. Gispan-Herman, T. Green, Y. Shaham and G. Yadid, *Journal of Neurochemistry*, 2003, 84, 930–938) A review of the new approaches to addiction shows that regardless of the *cause*, changes in brain structure are inevitable (AR Lingford-Hughes, SJC Davies, S McIver, TM Williams, MRC Daglish and DJ Nutt, Psychopharmacology Unit, School of Medical Sciences, University of Bristol, Bristol, UK British Medical Bulletin 2003; 65: 209–222):

> Alcohol and psycho-active substance misuse has far-reaching social, psychological and physical consequences. Advances in neuroimaging technology have allowed neurobiological theories of addiction to become better characterized. We describe the neurobiology of dependence, withdrawal, abstinence and craving states in alcohol, stimulant and opiate misuse. Structural neuroimaging techniques such as CT and MRI with new analytical approaches such as voxel based morphometry have shown wide-spread changes in stimulant and opiate abuse and atrophy, particularly in the frontal lobes, in alcoholism. Functional neuroimaging techniques such as PET, SPECT and fMRI reveal altered regional cerebral activity by all drugs of abuse. The neurochemistry of addiction, particularly involving dopamine, serotonin, opiate and GABA, has been studied with PET and SPECT and similarities between all drugs of abuse have been found such as reduced dopaminergic markers. The evidence derived from these advances in neuroimaging is likely to herald the emergence of new biological treatments in this important field.

A review of neuroimaging studies of how the brain changes as a consequence of addictive changes may be found at *Nat Neurosci.* 2004 Mar;7(3):211-4. Epub 2004 Feb 24.

Injection of cocaine alters endorphin levels (which leads to the feedback that eventually causes its depletion as in all addiction). This can be seen immediately on fMRI (Effect of experimenter-delivered and self-administered cocaine on extracellular b-endorphin levels in the nucleus accumbens, I. Roth-Deri, A. Zangen,

M. Aleli, R. G. Goelman, G. Pelled, R. Nakash, I. Gispan-Herman, T. Green, Y. Shaham and G. Yadid, *Journal of Neurochemistry*, 2003, 84, 930–938).

Not only does viewing pornography produce specific responses in certain brain areas as demonstrated using fMRI, the attempt to suppress that response is associated with activation of different areas of the brain (prefrontal and sublimbic regions), which suppression only occurs in non-addicted individuals, a marker for future studies. The *Journal of Neuroscience*, 2001, Vol. 21

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