Field Report

Sex, Drugs, and...Behavior Analysis?

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Close your eyes for a moment and imagine a stereotypic picture of behavior analysis in practice before reading onward. If you are even remotely familiar with applied behavior analysis, you likely pictured a child sitting knee to knee with a therapist who is holding reinforcers with some academic-related task nearby. Alternatively, you may have imagined a classroom of students under the instruction of a teacher or a team of staff undergoing behavioral skills training in a workplace.

Suffice it to say, you probably did not imagine a cocaine dependent individual from inner city Baltimore hypothetically choosing between immediate sex without a condom with someone likely to have a sexually transmitted infection or waiting for some delay before having sex with that person using a condom. Such a scenario plays out daily in Dr. Matthew Johnson's laboratory rooms as his research team explores ways to apply behavioral economics to improve healthy decision making.

Dr. Matthew Johnson is an associate professor in the Behavioral Pharmacology Research Unit at the Johns Hopkins Bayview Medical Center. If you are a regular consumer of pop media, you may already be familiar with Dr. Johnson from his appearance on CNN's *Situation Room* with Wolf Blitzer, an Ask Me Anything discussion on reddit.com, interview on NPR's *Kojo Nnamdi Show*, or in print in popular press outlets such as the *New York Times*, *Washington Post*, *USA Today*, *CBS News*, *NBC News*, and even Martha Stewart's *Whole Living Magazine* (yes, really!). Needless to say, Dr. Johnson's work—along with his post-doctoral research fellows (see Figure 1), Dr. Patrick Johnson and Dr. Evan Hermann (and recent graduate Dr. Natalie Bruner)—is incredibly fascinating and has caught the attention of mass media.

Located on the Johns Hopkins campus in Baltimore, MD, Dr. Johnson's laboratory is able to access a large population of individuals using substances such as cocaine, methamphetamine, or alcohol. Unfortunately, these behaviors are overwhelmingly associated with risky sexual behavior leading to HIV. Using resources such as Craigslist and simple local advertisements, Dr. Johnson's team is able to recruit these individuals into the laboratory to evaluate how they make decisions related to sex or drugs. The outcome measures of such studies are firmly rooted in the behavior analytic tradition. Delay discounting is assessed by asking these individuals to choose between smaller rewards available immediately or larger rewards available after some delay. Other measures involve behavioral economic demand for these commodities/behaviors (e.g., how much of a reinforcer is consumed at various prices/costs).

Dr. Johnson's laboratory research into the interaction between substance abuse and sexual risk behavior is relatively atypical in traditional applied behavior analysis. To help nudge investigators such as Johnson toward these topics, the National Institutes of Health has reserved specific pools of money for HIV related proposals. Johnson recognized the incredible potential

of behavior analysis to help address sexual risk behaviors and has had much success in doing so. Johnson says, “It’s fascinating . . . controlling HIV is a problem that’s largely behavioral. We spend so much money developing antiretrovirals and trying to find vaccines. I’m not saying we should stop trying to do that. . . . However, if we could actually get sufficient numbers of people to be adherent to their medication, we could bring HIV to a halt because these medications reduce transmission.” The lack of adherence, Johnson believes, is a result of hyperbolic delay discounting—valuing smaller immediate consequences over larger delayed ones. Johnson’s research on the sexual decision making of stimulant dependent individuals or heavy alcohol drinkers appears to confirm this. According to Johnson, these results have clear and straightforward implications for public health: “it takes just a few hours of delay of access to a condom before that decision shifts toward having unprotected sex . . . this really emphasizes the need for condom availability.” Dr. Johnson’s laboratory is now shifting to broader populations of individuals using contemporary data collection crowdsourcing techniques such as recruitment via Amazon Mechanical Turk. Such studies can thereby recruit participation of other individuals at-risk for HIV such as men who have sex with men who may be reluctant to participate or share identifying information in face-to-face studies in the laboratory.

A secondary line of research in this laboratory is the development of new biobehavioral treatments to enhance self-control. Toward this end, Dr. Johnson has teamed up with Dr. Miriam Mintzer (also at the Behavioral Pharmacology Research Unit), a cognitive psychologist with overlapping interests related to substance use. This collaboration is extending work done by Dr. Warren Bickel that suggests that working memory training may treat excessive delay discounting. This research is in its infancy, but it has potential for dramatically improving psychological services for individuals with addiction.

A noteworthy extension of this “outside the box” research on treatments for addiction is Dr. Johnson’s work on the therapeutic application of the psychedelic compound psilocybin. In collaboration with Dr. Roland Griffiths, Johnson’s laboratory is documenting the effects of psilocybin on smoking cessation treatments using de-

lay discounting, and demand curve analyses as outcome measures. The gist of this research is that participants enter the laboratory and ingest medical grade psilocybin under the careful supervision of Hopkins staff and clinicians. Participants report that the experience is akin to transcendence and subsequently produces a life-altering effect. A concomitant effect is that participants are more likely to quit smoking. Psychoanalytic and humanistic psychologists point to mentalistic and even supernatural mechanisms and explanations for these effects, likely due to the highly subjective nature of the experience. As a behavior analyst, Johnson takes a more parsimonious and operant perspective: “It seems to reframe things such that long-term consequences outweigh immediate pleasures of smoking. Put simply, there is likely an increased sensitivity to molar contingencies.” That is, participants reflect on their lives and are more apt to see the bigger picture of their existence and personal relationships with their family and friends. The temporal horizon of their worldview also seems to expand, wherein participants report an urge to care for their long-term existence. Johnson is cautious about the message this research sends the public, however. “We are not encouraging anyone to use this substance or any other substance. It’s like comparing medical application of morphine in comparison to street use of heroin . . . they are pharmacologically virtually identical, but they are very different beasts. I take the same view with psilocybin.”

Dr. Johnson’s laboratory is a prime example of the diversity of inquiry and application of applied behavior analysis. As Skinner famously wrote, “when you run into something interesting, drop everything and study it” (1956, p. 363). Dr. Johnson has done just that in these novel pursuits. His findings are not only neat; these findings have strong potential to change the landscape of sexual risk science and applied behavioral pharmacology. To learn more about Dr. Johnson’s laboratory, please visit: http://www.hopkinsmedicine.org/psychiatry/expert_team/faculty/J/Johnson.html.

References

Skinner, B. F. (1956). A case history in scientific method. *American Psychologist*, 11, 221–233.