

Blitzed: Nazi Germany, Hitler, Pervitin (Methamphetamine)- How Drugs Influenced World War 2

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How Cocaine and Amphetamines were Used in World War II

In a podcast episode with award-winning author and screenwriter [Norman Ohler](#), Dr. Puder and Dr. Borecky discussed Ohler's recent book, *Blitzed*, about how the Third Reich used drugs to optimize performance during World War II and how it may have changed the course of history.

During the war, a drug called Pervitin, containing 3 mg of methamphetamine, was invented in Germany. In anticipation of the blitzkrieg invasion into France, 35 million dosages were ordered for the three million German troops. Under its influence during the blitzkrieg, they were able to travel a staggering 22 miles per day in tanks, under fire, through the enemy lines, and then cut the telephone wires which disabled all communication from the French headquarters to the front lines.

Soldiers would take 3-5 tablets (9-15 mg of methamphetamine) with the max being around 100 mg per day. For context, today, for \$20-40, you can get 250 mg of methamphetamines on the street. Those who use the drug illicitly in current times will use between 300-800 mg of meth per day and use the fastest method of delivery possible (IV or intranasal). However, even at the lower doses, there is still a marked increase in aggression, enhanced and changed personality and behavior, confidence and less fatigue.

Germany was not the only country that sanctioned amphetamine use for soldiers during the war. General Eisenhower ordered half a million pills of benzedrine sulfate, each containing 5 mg of amphetamine sulfate. These were used during the grind of battle, reducing combat fatigue and instilling confidence to charge positions. British and American bomber pilots were also given stimulants to maintain alertness on long missions over Axis targets. Unlike the slow-release formulations used in modern ADHD therapy, the amphetamines of this era quickly filled the brains of these soldiers, enhancing the sense of power, aggression, and helping to suppress fear ([World War Speed, 2019](#)).

Ohler points out that meth wasn't the only substance given to the soldiers. Later in the war, German chemists concocted another drug called [D-IX](#). Each tablet contained 5 mg oxycodone, 5 mg cocaine, and 3 mg methamphetamine. It was tested on prisoners in a German concentration camp. During this test, this "shoe-walking unit" of prisoners was made to test the durability of different shoe materials by being given this stimulant and walking 25 miles per day while carrying a 25-pound backpack. This went on from morning until night for days until the shoes fell apart. Most gave up, but one record shows a man who took 75 mg of cocaine,

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Adam Borecky M.D., Janki Shah, David Puder, M.D.

walking up to 60 miles “without fatigue” and this became the standard others were forced to meet or face consequences. The Nazis concluded that soldiers should plow their way through the last battles of the war while taking 20 mg of cocaine salts or cocaine base chewing gum.

In a late-game gambit, Nazi soldiers boarded mini-submarines (1-2 person submarines with missile-launching capabilities) with chewing gum containing 20 mg of cocaine and 20 mg of methamphetamines for multi-day missions. In the modern street market, a starting dose of cocaine is around 50 mg, with effects lasting about 30 minutes. With continued use, tolerance can lead to doses of 1000 mg or more per day.

Hitler and Drug Use

Ohler is clear that Hitler’s drug use started years after he had already formed his racist ideals, dating back as early as 1933, but during the war these daily injections likely played a role in propping him up as his body weakened under stress, enhancing his charisma and helping him maintain the illusion that he still had secrets that would lead to their eventual victory over the Allied forces as the prospect of victory grew increasingly bleak.

Hitler’s cocktails of drugs, administered as injections by his personal physician, Theodore Morell, were quite varied and even experimental at times, and progressively became more frequent and more necessary as the war came to a close. Morell was an illustrious injector with a thriving practice of the wealthy class. At a time when Hitler became ill with severe gas, a friend introduced Morell to Hitler because of his reputation for basically being a miracle worker with his injection cocktails. Morell gave Hitler an injection of vitamins and probiotics. Henceforth, Hitler became known as Patient A in all of Morell’s meticulous medical records. Having a reputation for disliking doctors, after Morell was able to cure Hitler almost instantaneously, the obsessively private Hitler then appointed him as his personal physician.

As the war dragged on and the demands on Hitler continued to be very intense, Morell would go on to become completely indispensable to Hitler. Some would say they were even codependent on each other. By the last couple years of the war, Morell was giving Hitler multiple injections a day in order to help keep the declining Fuhrer maintaining a respectable and competent image. Ohler records that it is said that Hitler even remarked that he needed to be in a constant state of feeling permanently refreshed, a constant state of euphoria. But he was in remarkably poor health by the end of the war, partly because of the stress of running a war and partly because of the drugs to which he had become reliant on for years past. For years he maintained that he was not addicted, but towards the end of his life he came to the realization that he had become addicted to a variety of these drugs.

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Once the Allied bombings on Germany intensified towards the end of the war, pharmaceutical manufacturing plants were destroyed and Morell could no longer get the medication Hitler had become accustomed to, causing his body to go into severe withdrawal.

Before WWII

Prior to World War II, drugs such as morphine, aspirin and heroin (diacetylmorphine) were readily prescribed to everyone, even babies with coughs. Germany was worshipped for its party scene and was a symbol of quality, especially for drugs. There were laws in place prohibiting the use of some of these “party” drugs, but they were rarely enforced.

In 1933, when Hitler came into power, he could actually have been considered the first politician to combat the war on the legally-rampant drug use. The Nazis prided themselves as clean cut and had a harsh anti-drug policy. They even began throwing drug users into concentration camps as early as 1933. They used the current prohibitionist laws against drug use in the Weimar Republic, as they were simply enforced and conveniently combined with their anti-Semitic propaganda, where they portrayed Jews as drug users and a plague to the German people.

Addicts could be imprisoned for up to two years and potentially indefinitely. Doctors could be punished for up to 5 years with no work. The Weimar Republic became a surveillance state, with health information not considered confidential when it came to drug use because it was deemed a public threat. Drug cards were created and keeping records of family members who may have been taking or had become addicted to drugs was encouraged.

Hitler himself was obsessed with his image of perfection and portraying himself as a “health saint”. It was said that in the name of “not allowing poisons in his body” he would not even drink coffee. The myth of self-denial and self-sacrifice was essential to his success and influence.

Stimulant Introduction to Soldiers

Methamphetamine was introduced in 1938 and it was not viewed as a drug; it was seen as a legal stimulant along the lines of coffee and labeled as Pervatin.

When the war started, the use of stimulants was introduced to the soldiers, and it clearly gave them advantages that they could not refuse to take advantage of, such as being able to go days without sleeping, dulling the soldiers sense of fear, and increasing aggression needed for combat.

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The soldiers became guinea pigs, as many of the drugs were experimental and developed for certain purposes in the war, some more potent than others, and not studied for their effects prior to use.

Amphetamines in Psychiatry

Amphetamine use in psychiatry began in the early 20th century when children with “minimal brain dysfunction syndrome” (precursor to modern ADHD diagnosis) were given stimulants by the Rhode Island doctor, Charles Bradley, who noted a “a spectacular change in behavior [and] remarkably improved school performance during one week of benzedrine” ([Bradley, 1937](#)). Benzedrine is a 50/50 split of “right-handed” d-amphetamine and “left-handed” l-amphetamine, whereas Adderall is a 75/25 split. Most researchers agree that the right handed d-version is more psychoactive with patients ([Arnold et al, 1976](#)).

In 1994, [Popper](#) suggested that part of what makes Adderall so effective in ADHD, relative to other stimulants, is that its mix of numerous “salts” of amphetamine means different rates of absorption of the actual stimulant and a more smooth rise and fall within the body. This might also mean that Adderall is less addictive because of the less-rapid onset in contrast to the “pure” d-amphetamine.

What is the difference between methamphetamine and amphetamine?

A Methyl Group

The methyl group allows meth to cross the blood brain barrier more rapidly than an equivalent dose of amphetamine. If meth hits the brain quicker, it could be more addictive because of a more euphoric and therefore rewarding effect. It also seems to inhibit the dopamine transporter (DAT) more robustly ([Goodwin et al, 2009](#)). But other studies suggest that the differences between meth and amphetamine are vastly overrated. Lab animals self-administer meth and amph at similar rates, and humans can't tell the difference between equal doses of meth and amphetamine ([Balster & Schuster 1973](#); [Huang and Ho 1974](#); [Kuhn et al. 1974](#); [Lamb and Henningfield 1994](#)). See [Shobloock et al](#) for a more detailed review.

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Methamphetamines on the Street

Meth on the street is consumed more quickly and at higher amounts. The difference lies in the method of use and the dosing. A survey showed that 60% of meth users inject it, 23% snort it, and 52% smoke it ([Maxwell 2013](#)). Route of administration partly determines addictiveness because non-oral dosing delivers a lot more drug to the brain's pleasure centers a lot faster by bypassing first-pass metabolism. On top of this, meth abusers take much higher doses than those prescribed stimulants. Meth abusers tend to take anywhere from 300 mg to 800 mg of methamphetamine, while average clinical doses of Adderall are usually between 5 mg and 60 mg daily, assuming, as described above, that there are minimal differences clinically between equal doses of oral methamphetamine and amphetamine ([Simon et al. 2001](#)).

Risks of Amphetamines

Psychosis:

A 2019 review in the New England Journal of Medicine found that in regards to adolescents and young adults treated for ADHD, "new-onset psychosis occurred 1 in 660 patients" or that "amphetamine use was associated with a greater risk of psychosis than methylphenidate" or both ([Moran et al 2019](#)). The review also showed that 0.10% of patients prescribed methylphenidate had a psychotic episode, while 0.21% of patients receiving amphetamine did.

Studies have shown that two-thirds of those who take crystal meth (same ingredients as Pervitin) suffer psychosis. ("Pervitin fever" flourished in 1944 among soldiers)

There is risk of considerable harm with the use of methamphetamine at street level doses. Methamphetamines increase risk of psychosis five to elevenfold depending on length of use, and co-using alcohol or thc doubled the risk of psychosis ([McKetin, 2013](#)).

Neurotoxicity:

Chronic methamphetamine use leads to neurotoxicity, affecting catecholamine neurotransmission with impairments in learning, processing speed, information manipulation, and psychomotor speed. Rodents using acute or chronic methamphetamine had striatal dopamine depletion and destruction of striatal dopamine terminals. It took six months in rodents for striatal 5HT to normalize. Primates given the equivalent of doses and duration of street users had decreases in striatal DAT density, among other changes. Even after three years of

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abstinence, chronic methamphetamine abusers had decreased striatal DAT density on PET scan ([Meredith, 2005](#)).

Amphetamines on Campus

One 2008 review of misuse and diversion of stimulants by [Wilens et al](#) found 21 articles published between 1995 and 2006. They found that individuals more likely to misuse non-prescribed stimulant medications tended to be male, white, low-performing college students who report ADHD symptoms despite having no formal diagnosis. They review a study that reports 16% of children in a sample of grade school students were asked to either give, sell or trade their medications, with 4% having their medications stolen (n=103). Demographics of those at higher risk of misuse primarily includes college-age students who have ADHD symptoms despite no formal diagnosis of ADHD. The most common reasons given for using stimulants include “60% of students using it to study, 48% for alertness, 31% to ‘get high’ and 30% experimentation (n=4580).” The authors also reviewed a study of 54,079 individuals diagnosed with ADHD who were shown to misuse stimulant prescriptions and 58% met criteria for conduct disorder and another 75% for substance use disorder.

If the most likely misusers of prescription stimulants are low-performing college students, does this count against the “cognitive enhancement” hypothesis? Or, on the other hand, could it mean that the individuals most in need of “cognitive enhancement” due to undiagnosed ADHD are the populations flocking to use stimulants?

Conclusion

From use by invading soldiers in World War II to modern college students cramming for an exam, the use of prescription amphetamines for performance enhancement remains as widespread as it is controversial. While stimulants such as Adderall and methylphenidate have been shown to be safe and effective for the treatment of ADHD, the benefits for performance enhancement are, particularly in the long run, far less well established. Our clients should be aware that there is no such thing as a “free lunch” when it comes to pharmaceutical enhancement for wakefulness, weight loss, or academic performance, and that any use carries risks such as tolerance, crashes, adverse psychiatric effects, and adverse physiological effects. Clinicians prescribing amphetamines for legitimate purposes can help mitigate the risks of diversion and misuse by prescribing extended-release stimulants to lower addictive potential.

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Citations

Arnold, L. E., Huestis, R. D., Smeltzer, D. J., Scheib, J., Wemmer, D., & Colner, G. (1976). Levoamphetamine vs dextroamphetamine in minimal brain dysfunction: replication, time response, and differential effect by diagnostic group and family rating. *Archives of General Psychiatry*, 33(3), 292-301.

Goodwin, J. S., Larson, G. A., Swant, J., Sen, N., Javitch, J. A., Zahniser, N. R., ... & Khoshbouei, H. (2009). Amphetamine and methamphetamine differentially affect dopamine transporters in vitro and in vivo. *Journal of Biological Chemistry*, 284(5), 2978-2989.

Balster, R. L., & Schuster, C. R. (1973). A comparison of d-amphetamine, l-amphetamine, and methamphetamine self-administration in rhesus monkeys. *Pharmacology Biochemistry and Behavior*, 1(1), 67-71.

Bradley, C. (1937). The behavior of children receiving benzedrine. *American Journal of Psychiatry*, 94(3), 577-585.

Huang, J. T., & Ho, B. T. (1974). Discriminative stimulus properties of d-amphetamine and related compounds in rats. *Pharmacology Biochemistry and Behavior*, 2(5), 669-673.

Kuhn, D. M., Appel, J. B., & Greenberg, I. (1974). An analysis of some discriminative properties of d-amphetamine. *Psychopharmacologia*, 39(1), 57-66.

Lamb, R. J., & Henningfield, J. E. (1994). Human d-amphetamine drug discrimination: methamphetamine and hydromorphone. *Journal of the experimental analysis of behavior*, 61(2), 169-180.

Maxwell, J. C. (2014). A new survey of methamphetamine users in treatment: who they are, why they like "meth," and why they need additional services. *Substance use & misuse*, 49(6), 639-644.

McKetin, R., Lubman, D. I., Baker, A. L., Dawe, S., & Ali, R. L. (2013). Dose-related psychotic symptoms in chronic methamphetamine users: evidence from a prospective longitudinal study. *JAMA psychiatry*, 70(3), 319-324.

Meredith, C. W., Jaffe, C., Ang-Lee, K., & Saxon, A. J. (2005). Implications of chronic methamphetamine use: a literature review. *Harvard review of psychiatry*, 13(3), 141-154.

Blitzed: Nazi Germany, Hitler, Pervitin (Methamphetamine)- How Drugs Influenced World War 2

Adam Borecky M.D., Janki Shah, David Puder, M.D.

Moran, L. V., Ongur, D., Hsu, J., Castro, V. M., Perlis, R. H., & Schneeweiss, S. (2019). Psychosis with methylphenidate or amphetamine in patients with ADHD. *New England Journal of Medicine*, 380(12), 1128-1138.

Ohler, N. (2017). *Blitzed: Drugs in the Third Reich*. Houghton Mifflin Harcourt.

Popper, C. W. (1994). The story of four salts. *Journal of Child and Adolescent Psychopharmacology*, 4(4), 217-223.

Shoblock, J. R., Sullivan, E. B., Maisonneuve, I. M., & Glick, S. D. (2003). Neurochemical and behavioral differences between d-methamphetamine and d-amphetamine in rats. *Psychopharmacology*, 165(4), 359-369.

Simon, S. L., Richardson, K., Dacey, J., Glynn, S., Domier, C. P., Rawson, R. A., & Ling, W. (2001). A comparison of patterns of methamphetamine and cocaine use. *Journal of addictive diseases*, 21(1), 35-44.

Wilens, T. E., Adler, L. A., Adams, J., Sgambati, S., Rotrosen, J., Sawtelle, R., ... & Fusillo, S. (2008). Misuse and diversion of stimulants prescribed for ADHD: a systematic review of the literature. *Journal of the American Academy of Child & Adolescent Psychiatry*, 47(1), 21-31.