OPINION TESTIMONY ON SYNTHETIC CATHINONES FOR THE PUBLIC HEARING ON OCTOBER 4, 2017

Gregory B. Dudley, Ph.D.

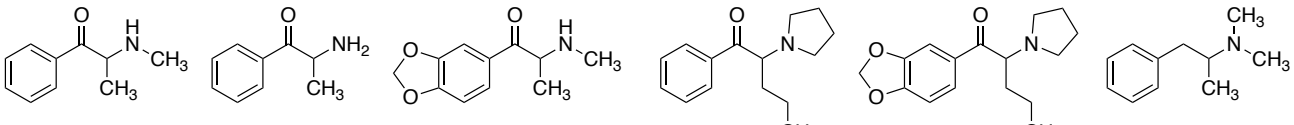
Introduction

I provide personal opinions and recommendations on how to incorporate new synthetic cathinone controlled substances into the Sentencing Guidelines. Recommendations include listing specific substances as well as providing categorical coverage of other Schedule I or II cathinones. Personal opinions are informed by the scientific literature, review of the current Guidelines, and observations from having served as an expert witness at sentencing hearings over the past few years.

Summary of recommended revisions proposed in the context of the current discussion

Under Cocaine and Other Schedule I and II Stimulants (and their immediate precursors)*, I propose inserting the following lines between Methcathinone and N-N-Dimethylamphetamine, as follows:*[†]

- 1 gm of Methcathinone = 380 gm of marijuana
- *1 gm of Cathinone = 380 gm of marijuana*
- *1 gm of 3,4-Methylenedioxymethcathinone/Methylone = 100 gm of marijuana*
- *1 gm of α-pyrrolidinovalerophenone/alpha-PVP = 100 gm of marijuana*
- *1 gm of 3,4-Methylenedioxy-α-pyrrolidinovalerophenone/MDPV = 40 gm of marijuana*
- *1 gm of Other Synthetic Cathinone Substances (unless covered elsewhere in these Guidelines) = 100 gm of marijuana*
- 1 gm of N-N-Dimethylamphetamine = 40 gm of marijuana



methcathinone | *cathinone* | *methylone (3,4-methylenedioxy-methcathinone)* | *alpha-PVP (α-pyrrolidino-valerophenone)* | *MDPV (3,4-methylenedioxy-α-pyrrolidino-valerophenone)* | *N,N*-dimethyl-amphetamine

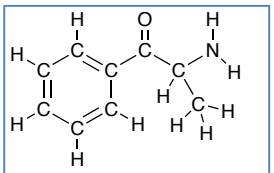
Outline

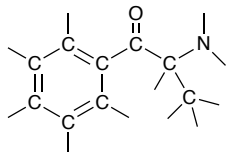
- ***Definition of a synthetic cathinone substance***
- ***Cathinone substances covered under the current Guidelines***
- ***Specific synthetic cathinones recommended for inclusion***
- ***The importance of categorical coverage exemplified with dibutylone***

[†] Note that I recommend the explicit inclusion of "cathinone", the parent structure of the synthetic cathinones structure class, to the Guidelines. Currently cathinone itself is only covered by the listing of khat plant, a plant that contains cathinone. If the Committee chooses to list cathinone as recommended here, then the marijuana equivalencies for khat, cathinone, and methcathinone should be reviewed for consistency. The khat plant should be listed in accord with the amount of cathinone that it typically contains (cf. hallucinogenic mush-rooms and psilocybin), and the marijuana equivalencies of cathinone and methcathinone should likewise align (cf. amphetamine and methamphetamine).

Definition of a synthetic cathinone substance

For the purposes of this discussion, a (synthetic) cathinone substance is a molecular substance (produced in a chemistry laboratory), the structure of which includes the cathinone core structure. Cathinone and its core structure are represented graphically on the right. Substitution of one or more hydrogen atoms in cathinone with a different atom or group of atoms, while maintaining the cathinone core structure, results in a new substance that could be classified as a cathinone substance.[‡]

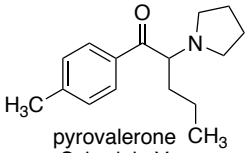

cathinone

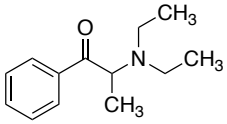

cathinone core structure

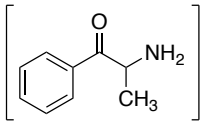
Cathinone substances covered under the current Guidelines

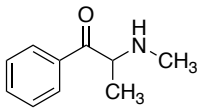
The Guidelines are explicit about how to treat several specific cathinone substances, including methcathinone, khat (a plant source of cathinone), diethylpropion (a Schedule IV substance), and pyrovalerone (a Schedule V substance). Penalties for cathinones are generally lenient relative to the marijuana standard, with methcathinone being a high-end outlier.

cathinone substances covered in the current Guidelines:

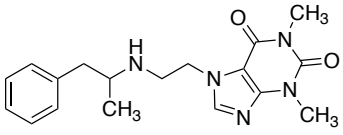

pyrovalerone
Schedule V
ratio 1:0.00625 (160:1)

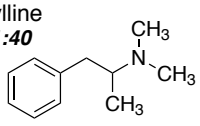

diethylpropion
Schedule IV
ratio 1:0.00625 (160:1)


khat plant [contains cathinone]
Schedule I
ratio 1:0.01 (100:1)

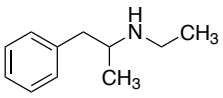

methcathinone
Schedule I
ratio 1:380

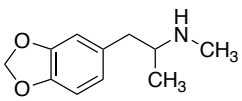
New synthetic cathinones are often compared to methcathinone but also to amphetamines, perhaps because there are more amphetamine substances listed. Among those substances covered in the Sentencing Guidelines, amphetamines are generally associated with higher marijuana equivalency ratios than cathinones (cf. methcathinone vs. methamphetamine, and diethylpropion vs. *N,N*-dimethylamphetamine or N-ethylamphetamine).

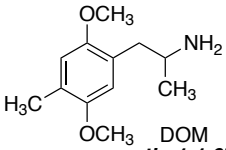

fenethylline
ratio 1:40

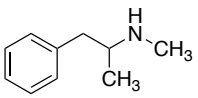

N,N-dimethylamphetamine
ratio 1:40

selected amphetamine substances covered in the current Guidelines:


N-ethylamphetamine
ratio 1:80


MDMA
ratio 1:500


DOM
ratio 1:1,670

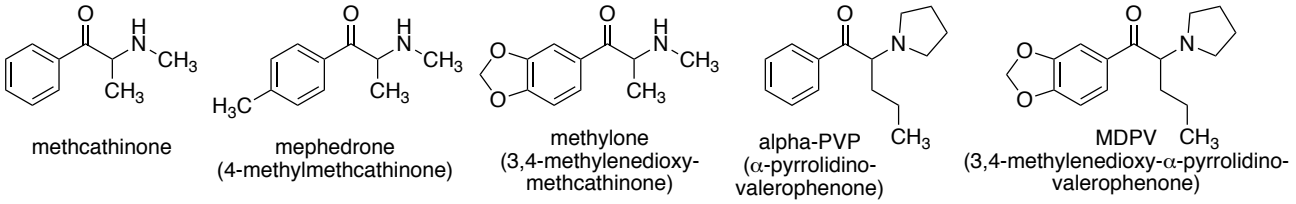

methamphetamine
ratio 1:20,000

[‡] An alternative draft definition of the cathinone structural class was provided to me for consideration. I do not specifically reference it here because it was a draft; I would be happy to discuss other proposed definitions.

Specific synthetic cathinones recommended for inclusion (adapted from previous testimony)

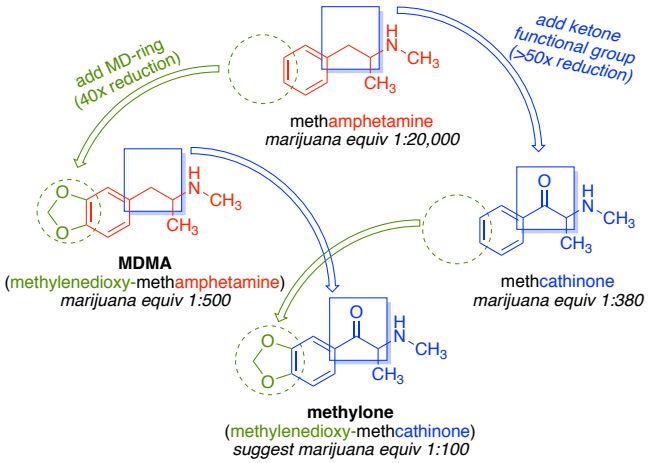
New designer drugs including synthetic cathinones have been scheduled as controlled substances, and they should also be added to the Drug Equivalency Tables in the Guidelines.

Synthetic cathinones: Methylone, MDPV, alpha-PVP. It had previously been suggested to add three synthetic cathinone substances — methylone, mephedrone, and MDPV — to the Drug Equivalency Tables. Mephedrone need not be a high priority, in my opinion; Mephedrone is substantially similar in structure to methcathinone. Instead of mephedrone, I encourage the Commission to list alpha-PVP (aka "Flakka"). alpha-PVP is substantially similar in structure to pyrovalerone (a Schedule V substance), but alpha-PVP is now notorious as a stimulant drug of abuse.



I suggest adding methylone and alpha-PVP to the Guidelines, each with a marijuana equivalency of 1:100. I also suggest adding MDPV, the MD- derivative of alpha-PVP, with an equivalency of 1:40. These listings could reasonably be extrapolated to other cathinone derivatives in the absence of categorical coverage, although I also recommend categorical coverage of synthetic cathinones. Other stimulant substances carrying a 1:100 marijuana equivalency ratio include 4-Methylaminorex ("Euphoria"), Methylphenidate (Ritalin), and N-Benzylpiperazine.

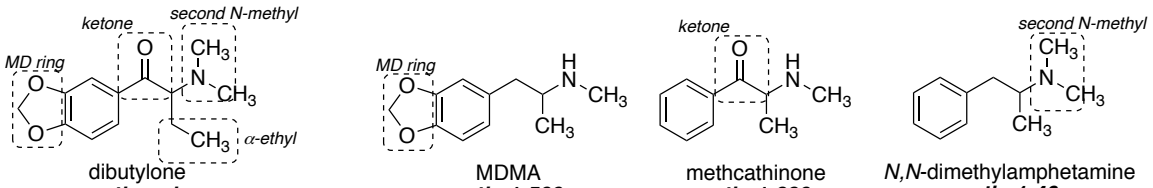
Listing these cathinone derivatives lower than methcathinone is consistent with amphetamine derivatives being listed lower than methamphetamine. *N,N*-Dimethylamphetamine is listed at 1:40, and methylenedioxy-methamphetamine (MDMA) is listed at 1:500 (which itself may be too high), both of which are significant downward departures from pure methamphetamine (1:20,000; see graphic at right). Likewise, *N,N*-dialkyl-cathinones (like MDPV and alpha-PVP) and methylenedioxy-cathinones (like methylone and MDPV) should be listed at a reduced ratio relative to methcathinone.



The proposed ratios are consistent with the current Guidelines using methcathinone as the starting reference point *and with the aim of providing reasonably harsh penalties for emerging synthetic cathinones*. Methcathinone is the most severely punished cathinone referenced in the Guidelines, just like methamphetamine is at the high end among amphetamine derivatives. The proposed ratios reinforce this trend while aligning new cathinone derivatives with current designer stimulant substances. However, the proposed ratios may be out of line with that of khat, the original cathinone-containing drug substance. If one were to use khat (1:0.01) as the starting reference point, then one might reasonably arrive at lower ratios for emerging synthetic cathinones. The current ratios for khat and methcathinone should be reviewed, and cathinone itself should be added to the list at a ratio that is consistent with both khat and methcathinone, as noted above.[†]

The importance of categorical coverage exemplified with dibutylone

Dibutylone is not specifically listed as a controlled substance, but there has been at least one case[§] in which dibutylone was treated as a "positional isomer" of pentylone, a cathinone listed in Schedule I but not in the Guidelines. Therefore, for the purposes of sentencing in this case, dibutylone was treated as a Schedule I controlled substance that was not listed in the Sentencing Guidelines. I was asked to prepare a multi-part report on dibutylone for defense counsel in this case; some key points are highlighted here. The complexities of applying Application Note 6 to dibutylone underscores the potential utility of categorical coverage for certain structural classes of emerging designer drugs.



Dibutylone is similarly comparable (but not "substantially similar") in chemical structure to MDMA, *N,N*-dimethylamphetamine, and methcathinone. Like dibutylone, all three of these listed substances have stimulant properties,** and they share elements of the phenethylamine core. Each of the listed substance shares an additional structural feature with dibutylone: MD ring (MDMA), dimethylamino (dimethylamphetamine), or beta-ketone (methcathinone). I am not aware of any reliable, consistent, and reasonable way to determine which substance is *most* similar to dibutylone.[††]

Categorical coverage of synthetic cathinones eliminates this comparison dilemma, although similar issues may arise in other contexts within the Guidelines. The "rule of lenity" provides an alternative avenue for resolving such dilemmas: namely, which of multiple closely related substances to choose in the absence of categorical coverage. I suggest that the following directive be added to Application Note 6 of the Guidelines: "*If an unlisted substance is closely related to two or more listed substances, then the Rule of Lenity shall apply, and the lowest marijuana equivalency of the closely related substances shall be applied to the unlisted substance.*"

I thank the Commission for allowing me the opportunity to offer these opinions, and I thank them in advance for considering my opinions in their future deliberations.

[§] Case 2:16-14002-CR-Rosenberg.

** At the time of the sentencing hearing, the effects of dibutylone on the central nervous system were not well characterized beyond preliminary experiments to support classification of dibutylone as a stimulant.

[††] Another example is that of ethylone, which has been compared to MDEA and to methcathinone, and there is ambiguity as to which is a better comparison.