From Pavlov to P:
The Development (and Disappearance) of
Tolerance to a substance means it takes more of that substance to feel the expected effects. A person who used to get a buzz from alcohol after two drinks might now find it takes four. A person who used to get “sloppy” after five drinks might not see this happen until seven. Students might see the ability to “hold their liquor” as a good thing or even a sign of status. Scientists, however, have increasingly shed light on the surprising finding that tolerance could primarily be triggered by drinking around the same set of cues (e.g., the same friends, the same chapter house basement, the same drink, etc.). Furthermore, drinking away from these cues (e.g., going to new bars on a 21 run, a spring break trip, or even a formal event, etc.) could lead to the “failure of tolerance” (Siegel, 2001, p. 512). The results, sadly and scarcely, could be disastrous.

One misconception surrounding tolerance is that somehow the person gets “less drunk.” Instead, the alcohol the person consumed will still be absorbed and result in the same blood alcohol content (BAC). Two people of the same size and sex, one with tolerance and one without, will reach similar BACs if they drink the same amount of alcohol over the same amount of time, even if one individual is showing the effects much more than the other.

Despite students perceiving tolerance as a “good” thing, the person without tolerance in this scenario is actually at an advantage. The physical signs telling him or her (and the people around) how much he or she has had to drink are evident. This person might decide to call it a night and knows not to drive. These signs are masked for the person with tolerance, meaning he or she might continue drinking, have a false sense of security, or feel like he or she could get behind the wheel.

There are other concerns the person with tolerance might face. From an addiction standpoint, tolerance is one of the seven criteria related to a diagnosis of alcohol dependence, and about eight percent of full-time college students meet criteria for dependence (Wu, et al., 2007). Further, students will often point out the student with tolerance needs to drink more to feel a desired effect, meaning a higher blood alcohol level is being reached. If this tolerance were to suddenly disappear, the full blown impact of that higher BAC could surface (Siegel and Ramos, 2002; Seigel 2011).

Siegel and Ramos (2002) wrote an important paper considering the role of Pavlovian (or classical) conditioning in the development of tolerance. Recall that Pavlov taught us that a completely unrelated signal (like a bell) could elicit a response (like salivation) when paired with the presentation of a cue linked to an unconditioned stimulus and response (like food and salivation). Put food in front of a dog and it salivates. Pair the presentation of food with the ringing of a bell and, in time, ringing the bell with no food present will elicit salivation as a conditioned response.

Consider then a typical Friday night. If a student drinks in the same room with the same group of friends every Friday, that room and those friends are no different than the bell to Pavlov’s dog. They are cues associated with the presentation of a substance to the body.

Why does that matter? Our body maintains homeostasis, or a set point, and the opponent-process theory suggests when the body is pushed in one direction, it pushes back in the opposite direction. Consider then, the implications for drinking. Alcohol as a depressant slows down the central nervous
system. After repeatedly drinking around the same set of cues, those cues signal to the body that alcohol is coming and the body is about to be slowed down. What does the body do? It tries to compensate by speeding up those central nervous system functions normally slowed by alcohol. The body makes an anticipatory response in the direction opposite of alcohol’s actions, which is what researchers call a conditioned compensatory response.

So, if students make the choice to drink and drink around the same set of cues, in time those cues will elicit a conditioned compensatory response. When students drink the same amount of alcohol as they typically do, they will not feel it in the same way, so they drink more until the effects are felt. To the students and any outside observers, they can now “hold their liquor.”

Unfortunately, this suggests that for those who have developed tolerance, a shift away from familiar cues will mean tolerance will fail to follow them to any new set of cues. The same amount of alcohol they have previously tolerated will now hit them much harder and even increase the likelihood of an overdose or alcohol poisoning.

One of the simplest ways to get a sense of whether or not cues have changed is by considering environment. In all likelihood, being in a new environment or new setting poses a much greater risk to a student with tolerance, because the new environment represents a new set of cues.

**In the fraternity/sorority community, consider what this means for:**

**New members**
The chapter, new city and new school are a brand new environment for these students. If they come to campus already having tolerance, there is every reason to be concerned about the impact of their first few drinking experiences.

**Events in which cues change dramatically or a party outside familiar confines**
Risks abound at a formal or dance in which people dress up (new cues), leave the house for a hotel (another set of new cues), and might be around a group of guests not part of their regular cohort (yet again, new cues).

**Parties at chapter houses**
From a liability and risk prevention standpoint, tolerance failure highlights reason for concern when parties are hosted at a chapter house and people unfamiliar with the facility attend. The tolerance these attendees have will fail to follow them to the new setting, meaning drinking the same amount would result in much greater impairment.

**21st birthdays and road trips**
Certainly environment changes come in to play when a person goes to a bar for the first time on their 21st birthday; additionally, he or she is likely consuming beverages unfamiliar to him or her. Trips taken during spring break or summer also put students in a completely new environment with new cues.

**New or unfamiliar drinks**
Siegel (2011) reported that even taste can be a cue. Students with tolerance who drink a familiar tasting drink in which the taste and appearance signal alcohol is on the way have greater tolerance than they do to a new drink of the same potency. A drink they have never had before will hit them “harder.”

The important thing to know is that it does not seem someone can “beat” this phenomenon. If people always drink in a different environment, then the people they are with or the type of alcohol might be the most salient cue. If people always drink in a different environment and always drink a different beverage, then time of the night might be the most salient cue. What is clear, however, is a student who goes to a new environment is likely facing significant risk.

As fraternity and sorority professionals, you might feel this is important information to pass on to new members and to chapters prior to high-risk times of year (welcome week, road trips for football games, spring break, Halloween, formals, etc.). Consider working with offices on campus that provide alcohol prevention programs and outreach so students are aware and can be introduced to evidence-based strategies to minimize these risks.

As a field, continued research is needed to determine best practices around how to incorporate information related to tolerance into effective prevention and intervention programs. For years, we have encouraged students to know what they bring to the table based on their size, sex and drinking experience. It seems clear, however, they need to be aware of what the table brings to them.

As they look out for their brothers and sisters, recognizing what risks are posed by new environments will hopefully translate
to seeking help when someone seems to be affected more than normal. As they look out for themselves, recognizing what risks are posed by new environments will hopefully translate to approaching those settings in ways that will reduce harms and unwanted effects.

REFERENCES


Safe Strategies

While the best way to avoid all unwanted effects of alcohol is to choose to abstain, and while it is illegal for students under 21 years of age to consume alcohol, the following are strategies students could use if they make the choice to drink.

- Be aware of risks posed by a new bar or party setting. Students will be exposed to different social, visual and auditory cues as well as unique sights, smells and tastes of unusual drinks they might consume. This will leave them unprepared for the effects of alcohol consumed. If a student always drinks “X” number of drinks, educate students to consider cutting that number in half when drinking in a new environment.

- If a chapter event is being held at a location new to many members and/or their guests, educate the chapter about tolerance concerns in advance and increase strategies to assist with safe event monitoring.

- Even at lower BACs, there are problems with reaction time and judgment, so driving after drinking even small amounts can be dangerous. These effects will be amplified if students drink in a new environment.

- Avoid trying to “keep up” with or “out drink” others, particularly when someone else has the “home field advantage,” meaning that student is around familiar cues when the other student is not.

- When on a trip, students should carry the address of where they are staying and have a plan for how to get back. They should find out if the location has an emergency number (like 911 for the U.S.; emergency numbers vary by country). They should also know the drinking laws of their travel destination.

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