Teacher's Guide

I. Overview and Background

What is *buffalo*?
Tiltfactor Laboratory's *buffalo*™ is a 20-minute card game for 2-8 players, ages 14 and older. It was created as part of a National Science Foundation-funded project to design and study games to combat implicit bias and stereotype threat against girls and women in science, technology, engineering, and math (STEM) fields.

How is *buffalo* played?
In *buffalo*, players simultaneously flip cards from two decks. One deck contains cards that list adjectives on them, including ones based on age (e.g., *young, old*), race (e.g., *Hispanic*, *Caucasian*, *multiracial*), physicality (e.g., *tall*, *unattractive*, *blond*), personality (e.g., *strong*, *corrupt*, *funny*), and ideology (e.g., *spiritual, eco-friendly*). The other deck contains cards listing nouns, including ones based on profession (e.g., *scientist*, *supermodel*, *talk show host*), role (e.g., *grandparent*, *superhero*), and organizational affiliation (e.g., *environmentalist, feminist*). Using the noun-adjective combination formed by the cards drawn, players race to be the first to shout the name of a real-life person or fictional character whose identity satisfies both words.

Sample adjective cards (in orange) and noun cards (in blue).
A player could win the "Male" and "Musician" cards by shouting out, "Justin Bieber."

What is the underlying goal of *buffalo*?
The intention of the game is to activate a plethora of cross-cutting identities, some of which may fit with stereotypes and are thus easier to come up with (e.g., a "*male scientist*" or "*greedy CEO*"), whereas others may defy players' preconceptions of a category and thus be more difficult to name (e.g., a "*female scientist*" or "*saintly CEO*"). By exposing players to descriptor combinations that may or may not be consistent with common stereotypes, the game can facilitate sophisticated thought and discussion about the ways that individuals' perceptions can be influenced by prior associations and expectations.

The design of the game was informed by psychological theory and research on stereotype threat and implicit bias, two powerful psychological obstacles that have been shown to reduce self-efficacy, persistence, and performance among members of underrepresented groups in STEM.

What is Stereotype Threat?
Whenever individuals find themselves in situations in which they know that a negative stereotype toward their social identity group exists, they can find themselves facing anxiety about conforming to this stereotype. This anxiety is known as stereotype threat.

> Example: *From hundreds of interviews that I've conducted with black college students, it's clear that many believe that the stereotype [that African Americans are less intelligent] places them in situations freighted with unnerving expectations. Some report feeling a sense of unfairness, that there will be less patience for their mistakes than for white students' mistakes, and that their failure will be seen as evidence of an unalterable limitation rather than as the result of a bad day. Others report worrying that the stereotype might be true or that their poor performance will reflect badly on other members of their group. Such feelings can make black students more apprehensive than white students about being evaluated and about the prospect of failure. They will often begin to question whether they truly belong in an arena that prizes academic talent.* — "The Threat of Stereotype" by Joshua Aronson (2004)

Research has shown that stereotype threat can negatively impact performance, particularly on tasks that require attention and focus. Specifically, stereotype threat activates physiological stress responses, encourages excessive performance monitoring, and instigates the attempt to mentally suppress thoughts of self-doubt, all of which deplete cognitive resources (Schmader et al., 2008). Likewise, the experience of threat may hinder individuals' flexibility in problem-solving (Carr & Steele, 2009) and activate failure-avoidance goals and worry as opposed to performance-approach goals and confidence (Brodish & Devine, 2009).

> Example: Joshua Aronson writes, *"On [a test presented as non-evaluative], the black students solved, on average, twice as many items as on the test that we presented in the standard way. The manner in which we presented the test had no effect whatsoever on the white students. In another set of studies, we found that merely asking students to indicate their race on a demographic questionnaire prior to starting the test had a similarly debilitating effect on black students. When they thought we were interested in their race, their test scores plunged."* For black students, a test that was designed to evaluate their abilities and intelligence was more

challenging because of the anxiety caused by stereotype threat. — "The Threat of Stereotype" by Joshua Aronson (2004)

Stereotype threat can affect members of any group if they are placed in a situation in which they risk conforming to an established negative stereotype.

> Example: A study found that white male engineering students suffered decreased performance on a math test if they were told that the test was meant to help researchers understand the superior math performance of Asian students (Aronson et al., 1999). Likewise, a study involving Asian female students found that their performance was hindered if they were reminded of their gender, but boosted if they were reminded of their ethnicity, prior to taking a standardized math exam (Shih, Pittinsky, & Ambady, 1999).

Fortunately, research has revealed a number of effective means of reducing stereotype threat and counteracting its negative effects on performance and persistence, such as:

- Actively negating or dismissing an activated stereotype (Kawakami et al., 2000)
- Affirming a positive aspect of one's identity to counteract the activation of a negative stereotype (Logel et al., 2009; Martens et al., 2006; Rydell et al., 2009)
- Reframing a stereotype-relevant task as a challenge rather than a threat and emphasizing how the task can be an enjoyable way to gain knowledge or build skills rather than how it can be a way for individuals to show their inherent talent or ability (Alter et al., 2010)
- Adopting a *growth mindset* to anticipate improvement in a particular domain through persistence and practice (Aronson, Fried, & Good, 2002)

What is Implicit Bias?

Negative stereotypes can affect our assumptions without our conscious knowledge. Implicit bias, by definition, reflects an unconscious and automatic negative association that is incorporated in one's mental representation of a particular social group or domain as a result of the prevalence of stereotypes in the social environment (Greenwald and Banaji, 1995; Greenwald and Farnham, 2000).

What's particularly insidious about implicit bias is that even individuals who are consciously aware that the stereotypes are unfounded may find themselves unconsciously making negative stereotypical judgments. In STEM domains, for example, individuals may harbor a strong implicit association between "math" and "negative" or a stronger implicit association between "math" and "male" than between "math" and "female," even if they are not consciously aware of such representations and, moreover, even if they have a positive attitude toward girls' ability to excel at math at the conscious level.

Combating implicit bias requires targeting the automatic association and either changing it (e.g., "automatizing" a new association through repeated exposure) and making people aware of the often unrecognized impact that implicit bias can have

on their perceptions, judgments, interpretations, attitudes, and behaviors. Among the most successful techniques for reducing implicit bias that have been validated by empirical investigation include:

- Exposing individuals to positive role models from a stereotyped group (e.g., successful female mathematicians or scientists: Blair et al., 2001; Stout et al., 2011)
- Repeatedly negating an activated stereotype (Kawakami et al., 2000) or reinforcing one's goals to be egalitarian in one's views of social groups (Moskowitz & Li, 2011)

More Resources

For more information on stereotype threat and implicit bias, check out these websites:

The American Association of Undergraduate Women (AAUW) has published an informational booklet that details research findings regarding women's involvement with Science, Technology, Engineering, and Mathematics (STEM) fields (Hill et al., 2010):
http://www.aauw.org/learn/research/upload/whysofew.pdf

The Implicit Association Test (IAT) is the most widely used psychological measure of unconscious (implicit) associations and is available at this Harvard website:
https://implicit.harvard.edu/implicit/demo/

Joshua Aronson, a leading scholar on stereotype threat, published an article discussing the phenomenon in the journal *Educational Leadership.*
http://www.ascd.org/publications/educational-leadership/nov04/vol62/num03/The-Threat-of-Stereotype.aspx

II. Suggested Classroom Game Play

Duration: 45 minutes

1. Play *buffalo*

Divide students into groups based on the number of card sets available. The game should be played by groups of 2-8 players. If there are not enough card sets to accommodate all students, each card deck (blue, yellow) can be split so that each group can have a set of cards.

Instructions to play the game are included with each card set; a summary of the rules is included below.

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buffalo *is a high speed game where players try to be the first to name a famous person (real or fictional) that fits into two categories generated by the blue and yellow decks of cards. A player flips one of each type of card for the group to see. The first player to name a person that matches both cards collects the cards. If no one can name a person, then the group is "buffaloed" and must flip two more cards over--one from each deck. Players name people that match any combination of the cards in front of them and collect the cards that correspond to their response. If players draw a buffalo card, than the first player to name a person that matches any combination of the cards in front of them collects all the cards, even if they do not all correspond to the player's response.*

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2. Reflection

After groups have played for about 10 minutes, reconvene for a group reflection. Ask students to name the combinations that "buffaloed" their group or combinations that they found particularly challenging. Encourage students to discuss why some combinations are more difficult than others. After the reflection, students should finish the game.

3. Return to Play

As students play *buffalo* again, ask a player (the Recorder) to record the combinations that "buffalo" the group and to jot down notes regarding the reasons why the combinations were difficult.

In subsequent game play sessions, you may choose to "stack" the decks to present players with noun/adjective pairs that address particular issues or biases. For example, here are some suggested card pairs that challenge traditional gender stereotypes:

Orange Cards	Blue Cards
Heroic	Princess
Long-haired	Doctor
Bearded	Homemaker
Flamboyant	Heartthrob
Strong	First Lady
Feminine	Jock
Female	Scientist
Fashionable	Head of State
Masculine	Figure Skater
Legendary	Nurse
Muscular	Dancer
Male	Fashion Designer

4. Guided Discussion

Once groups have completed their games, ask each Recorder to share the combinations that they wrote down along with the reasons why the combinations were difficult. Make a class list of particularly difficult pairs of cards. Ask students again why some cards are difficult to match. You may want to introduce the concepts of stereotype threat and implicit bias during this discussion to show how these phenomena affect *buffalo* game play.

5. Personal Research

Optionally, you may want to point students to https://implicit.harvard.edu/ where they can take an Implicit Association Test (IAT). The IAT measures the unconscious positive or negative associations that users might have between certain groups. Many students will be surprised to learn that their implicit associations are often strongly linked to stereotypes even if they intellectually know that the stereotype isn't true.

IMPORTANT: We recommend allowing your students to experience the game without explicitly telling them beforehand the game deals with stereotypes and bias. Our empirical work has shown that simply telling players ahead of time that the game deals with "pop culture stereotypes" reduced players' enjoyment and engagement levels. In contrast, we recommend using more neutral language to introduce the game – for instance, telling students the game deals with "pop culture *knowledge*" – and then using the post-game reflection period to discuss how the game broaches the topics of stereotypes and bias.

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