

The Importance of Play



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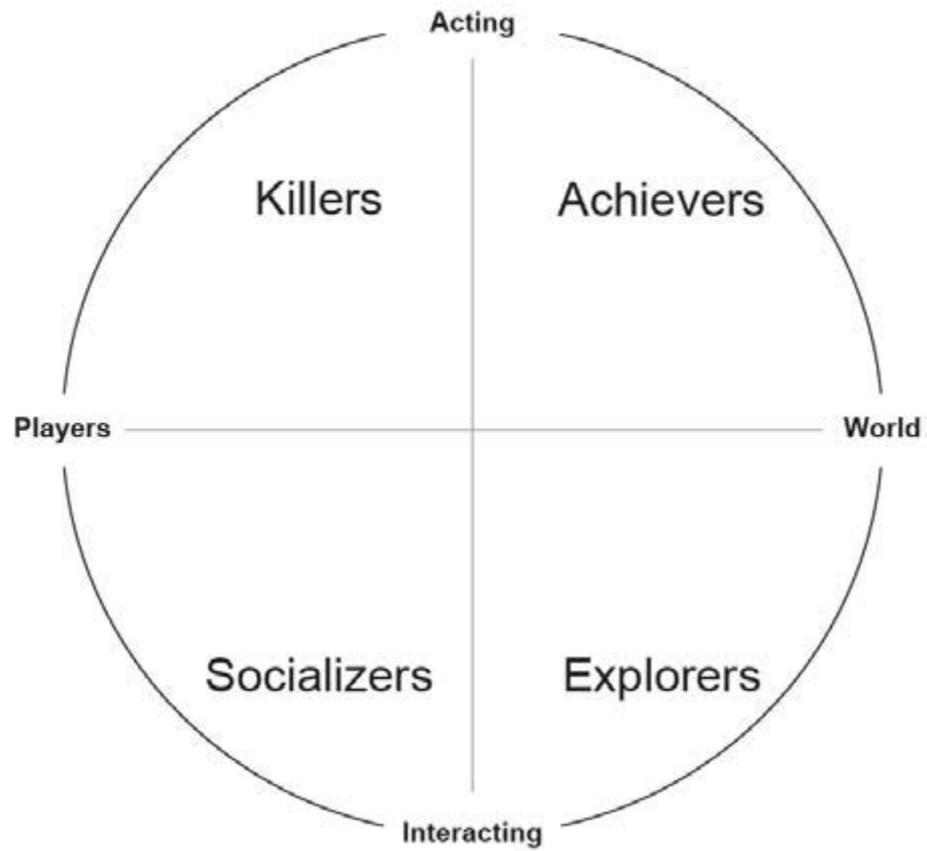
- On August 1, 1966, the day psychiatrist Stuart Brown started his assistant professorship at the Baylor College of Medicine in Houston, 25-year-old Charles Whitman climbed to the top of the University of Texas Tower on the Austin campus and shot 46 people. Whitman, an engineering student and a former U.S. Marine sharpshooter, was the last person anyone expected to go on a killing spree. After Brown was assigned as the state's consulting psychiatrist to investigate the incident and later, when he interviewed 26 convicted Texas murderers for a small pilot study, he discovered that most of the killers, including Whitman, shared two things in common: they were from abusive families, and they never played as kids.
- Brown did not know which factor was more important. But in the 42 years since, he has interviewed some 6,000 people about their childhoods, and his data suggest that a lack of opportunities for unstructured, imaginative play can keep children from growing into happy, well-adjusted adults. "Free play," as scientists call it, is critical for becoming socially adept, coping with [stress](#) and building cognitive skills such as problem solving. Research into animal behavior confirms play's benefits and establishes its evolutionary importance: ultimately, play may provide [animals](#) (including humans) with skills that will help them survive and reproduce.

Neurobiology of play

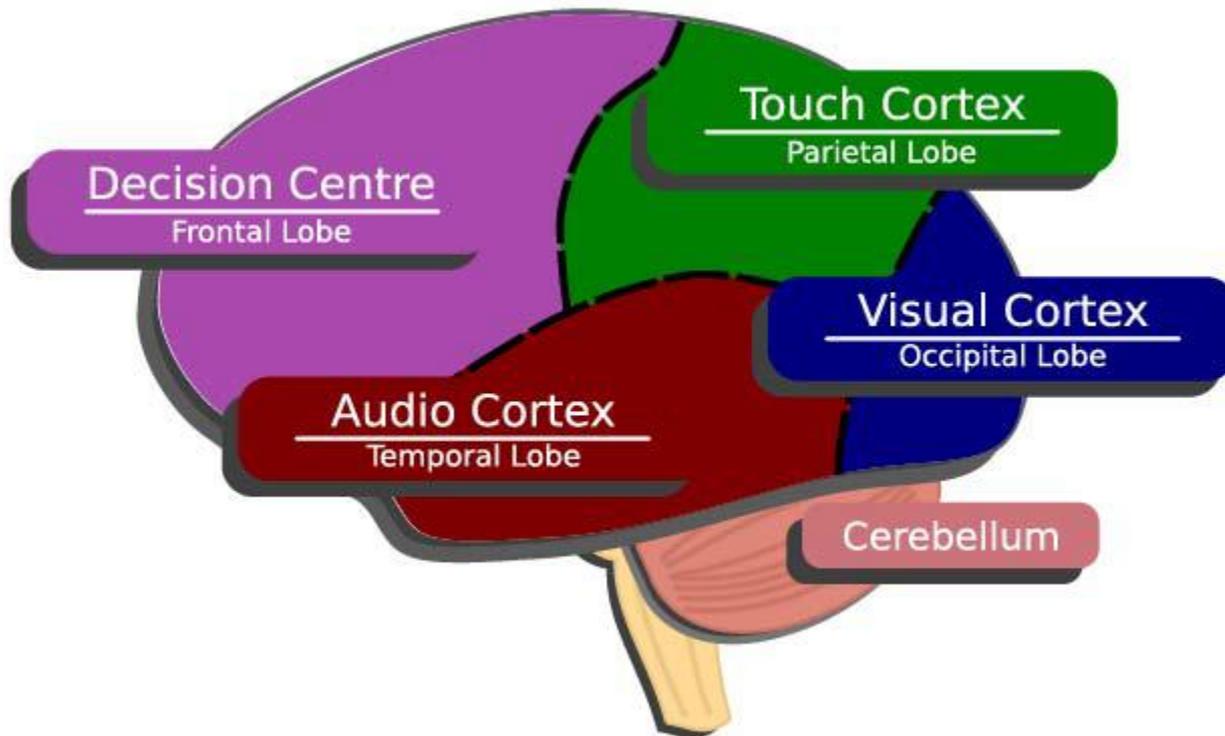
- The main observations discussed here relate to various key brain structures in mammalian nervous systems:
- Nucleus accumbens and the dopaminergic reward system
- in general
- Orbito-frontal cortex (OFC), and in particular its close connection to the dopaminergic reward system
- Hippocampus and sensory cortices
- The “fight-or-flight” response, consisting principally of the amygdala and the neurotransmitters epinephrine and norepinephrine
- Testosterone
- Hypothalamus and the neurotransmitter oxytocin
- Mirror neurons located in the pre-motor cortex and the inferior parietal cortex.
- This list may not be complete, and represents a first attempt at identifying the critical parts of the mammalian nervous system involved in play.

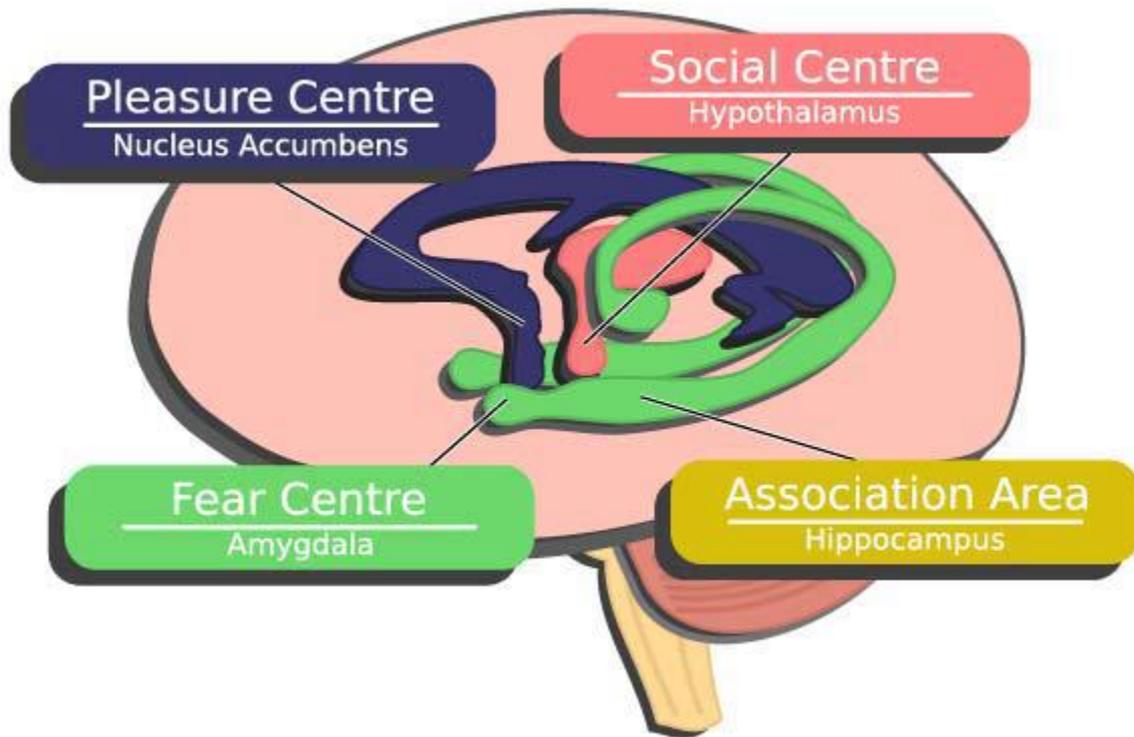
- In his fundamental work, Roger Caillois [17] defined four different
- elemental forms of playful behavior, which we refer to in this
- context as patterns of play based on the discussion by Bateman
- [8]: *agon* (i.e., conflict or competition), *alea* (i.e., chance), *mimicry*
- (i.e., imitation or role-playing), and *ilinx* (i.e., vertigo or sudden
- shock). Caillois also classified games along an activity dimension
- with two extremes, ranging from structured *ludus* (i.e., a
- rule-based playing activity) to unstructured *paida* (i.e., spontaneous
- playful activity). We will go on to discuss how these patterns
- can be linked to brain mechanisms and the nervous system for
- explaining why these patterns of play are noticeable.

- The *play* definition provided by Malaby [42]
- fits the purposes of our paper, namely that play is a dispositional
- attitude characterized by a readiness to improvise in the face of
- contingency. This in turn leads to Malaby's definition of *game* as
- “a semibounded and socially legitimate domain of contrived contingency
- that generates interpretable outcomes” [41]. On this
- reading, *play* is a state of mind that individuals enter into, and
- *games* are socially grounded practices that contrive to allow participants
- to enter into a state of play.



- Bartle's Achievers and
- Socializers appear to correspond to a preference for activation of
- specific brain regions, while Bartle's Explorers may conflate two
- distinct neurobiological systems. However, Bartle's Killer type
- does not appear to implicitly relate to any given brain region,
- although may relate to testosterone.





Pleasure Centre
Nucleus Accumbens

Social Centre
Hypothalamus

Fear Centre
Amygdala

Association Area
Hippocampus

- At the core of any neurobiological description of games – and by
- extension of play – lies the dopaminergic reward system.
- The pleasure center of the brain (the nucleus accumbens) is well established
- as the critical brain region associated with the neurotransmitter
- dopamine, which in turn is implicated in habit formation,
- reward-seeking behaviors and addiction [

- “The right to play is a child’s first claim on the community. Play is nature’s training for life. No community can infringe that right without doing deep and enduring harm to the minds and bodies of it’s citizens”

- "What do most Nobel Laureates, innovative entrepreneurs, artists and performers, well-adjusted children, happy couples and families, and the most successfully adapted mammals have in common? They play enthusiastically throughout their lives."