



Translational Research Group

at the USMC Center for Advanced Operational Culture Learning (CAOCL)

Assessing Psychological Claims about the Teenage Brain

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BLUF: While Marine Corps leaders might be tempted to turn to psychological research on the teenage brain to assist in understanding their very young force, psychological research on the teen brain cannot inform or improve any USMC policies or practices in its current state.¹ Here's how to be a more informed consumer of this popular research.

Let's say you just read an account of a psychological study that claimed a link between teen aggression and activity in a certain brain region. Can you trust the study's conclusions or claims? Try asking these questions to find out:

- **Is the psychological study valid?** Is the study really measuring what it claims? For example, how do the researchers define aggression? Is it verbal, nonverbal, or physical? Must it be of a certain duration or intensity? Is it directed towards a peer or an adult or an object? If the researchers claim that certain activity in a region of the brain indicates an aggressive response, what is the basis for that claim?
 - Many of the studies of the teenage brain in psychology rely on measuring brain activity with functional magnetic resonance imaging (fMRI), an imprecise tool as it cannot unpack the sequence of cognitive events even when a participant reads a single word – instead, multiple areas of the brain show simultaneous activation. Equally important, fMRI activity is almost entirely descriptive – i.e., it might show activity in my amygdalae when I shock someone but not when I hug them, but so what? It does nothing to explain why the observed differences occur. Currently, fMRI activity in an area of the brain is interesting but does not expand what we know about behavior.
- **Is the psychological study reliable?** Is this study's conclusion about aggression the first — or even among the first — of its kind? Or, has this result been established across a variety of studies with various teens over years or even decades? Which would you trust?
 - The studies supporting any particular claim about the teenage brain are few in number and results can vary.
- **Is the psychological study sample large & random?** Do the conclusions about aggression rest on 10 participants or 100? How did the researcher choose the participants? The more participants involved and the more randomly they are selected, the greater the likelihood the results represent other teens (and are not just particular to this one study).
 - Studies on the teenage brain often involve 10-20 adolescents (compared to a similar number of adults and/or children) and are based on human volunteers or non-human test participants such as rats, hamsters, or monkeys. More importantly for relevance to USMC, the human participants are highly unlikely, based on sheer odds, to be future Marines.
- **Is the psychological study meaningful?** “Statistical significance” sounds impressive, but what does it really mean? The real question is not just significance, but magnitude. How *large* is the statistically significant finding?
 - Statistically significant effects have been found in psychological research on the teen brain, but the effects are typically small as opposed to moderate or large.

As evidenced by the complexity of the questions you need to ask, any black and white claims about the teen brain are likely false. If the above information does not accompany a psychological claim about the teen brain and a subject matter expert is unavailable to consult, it pays to be a skeptic.

¹ See similar claims about the inadvisability of using brain scans as legal evidence: Michael S. Gazzaniga, *Who's in Charge? Free Will and the Science of the Brain* (New York: HarperCollins, 2011), 181, 190, 195, 199.

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