



## Chapter 6

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# Getting the Big Picture

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# Final Questions



**STEP 1:** Determine if the research was a sample survey, an experiment, an observational study, a combination, or based on anecdotes.

**STEP 2:** Consider the Seven Critical Components in Chapter 2 to familiarize yourself with the details of the research.

**STEP 3:** Based on the answer in step 1, review the “difficulties and disasters” inherent in that type of research and determine if any of them apply.

**STEP 4:** Determine if information is complete. If necessary, find the original source of the report or contact the authors for missing information.

# Final Questions



**STEP 5:** Ask if the results make sense in the larger scope of things. If they are counter to previously accepted knowledge, see if you can get a possible explanation from the authors.

**STEP 6:** Ask yourself if there is any alternative explanation for the results.

**STEP 7:** Determine if the results are meaningful enough to encourage you to change your lifestyle, attitudes, or beliefs on the basis of the research.

# Case Study 6.1: *Mozart, Relaxation, and Performance on Spatial Tasks*

## Study Details:

- **Repeated measures** experiment on 36 college students.
- Each participated in **3 listening conditions**:  
(1) Mozart, (2) Relaxation Tape, (3) Silence.
- Each condition followed by set of abstract/visual reasoning tasks (from IQ test). Scores translated to full IQ score.
- **Averages**: Mozart = 119 significantly higher than both Relaxation Tape = 111 and Silence = 110.
- Researchers tested some **potential confounding factors** (pulse rates, order of presentation, different experimenters) and found no effect.

**Source: Rauscher, Shaw, and Ky, 14 October 1993, p. 611.**

# Case Study 6.1: *Mozart, Relaxation, and Performance on Spatial Tasks*

**STEP 1:** Determine if research was sample survey, experiment, observational study, a combination, or based on anecdotes.

**Repeated measures, randomized experiment but no info about how (or if) randomly assigned the order of conditions.**

**STEP 2:** Consider the Seven Critical Components.

**Component 2: not told whether those who tested participants knew the purpose of experiment. Component 1: not told about funding. Component 3: not told how participants were selected.**

## Case Study 6.1: *Mozart, Relaxation, and Performance on Spatial Tasks*

**STEP 3:** Review “difficulties and disasters” inherent in that type of research and determine if any of them apply.

**Experimenter effect:** not told whether subjects knew intent of experimenters; subjects could not be blinded.

**Generalizability:** results obtained 10 min in a lab may not extend to real world. **Confounding:** not told which IQ task assigned; not told if amount of contact by experimenter was the same for all three conditions.

**STEP 4:** Determine if information is complete. If necessary, find original source of report or contact authors for missing info.

**Substantial information missing and would be helpful.**

## Case Study 6.1: *Mozart, Relaxation, and Performance on Spatial Tasks*

**STEP 5:** Ask if results make sense in larger scope of things. If counter, see if a possible explanation from the authors.

**Authors only reference “correlational, historical, and anecdotal relationships between music cognition and other ‘higher brain function’ – no other justification of results.**

**STEP 6:** Ask if any alternative explanation for the results.

**Perhaps ... subjects knew Mozart was ‘best’; IQ task for Mozart ‘easier’; experimenters interacted more for Mozart.**

**STEP 7:** Determine if results meaningful enough to change lifestyle, attitudes, or beliefs on the basis of the research.

**Helpful if you will be taking abstract/spatial reasoning test.**

## Case Study 6.2: *Meditation and Aging*



### Study Details:

- Spend 20 minutes twice a day for a body that is measurably more youthful.
- DHEA-S is an age-associated enzyme.
- Study compared levels of DHEA-S in 270 men and 153 women who practiced Transcendental Meditation (TM).
- DHEA-S levels higher in all age groupings and in both sexes among meditation group than in nonmeditating controls, independent of diet and alcohol or drug consumption.

**Original Source: Glaser et al., 1992, pp. 327-341.**



## Case Study 6.2: *Meditation and Aging*

**STEP 1:** Determine if research was sample survey, experiment, observational study, a combination, or based on anecdotes.

**Observational Study: researchers simply measured meditators and non meditators.**

**STEP 2:** Consider the Seven Critical Components.

**Missing from brief news report ... Author Glaser was researcher at University known for teaching TM; no funding info; not told details about control group being patients at cosmetic dermatology practice; meditators mostly from University and more were vegetarian and less likely to drink/smoke; missing info about when and how measurements made.**

## Case Study 6.2: *Meditation and Aging*



**STEP 3:** Review “difficulties and disasters” inherent in that type of research and determine if any of them apply.

**Confounding and implication of causation. Many differences between control and TM groups. No random assignment => causal conclusion cannot be made. Results may not extend to practitioners of other meditation techniques or others not so heavily involved in TM.**

**STEP 4:** Determine if information is complete. If necessary, find original source of report or contact authors for missing info.

**Most info available in original report (not in brief news report). Not told if those who drew/analyzed blood knew purpose of study.**

## Case Study 6.2: *Meditation and Aging*

**STEP 5:** Ask if results make sense in larger scope of things. If counter, see if a possible explanation from the authors.

**No info about prior knowledge in news report. Original report cites other evidence. Another observational study on use of medical plans supports idea of meditators healthier.**

**STEP 6:** Ask if any alternative explanation for the results.

**Perhaps ... meditators healthier, less likely to drink or smoke. Location could be issue: TM in Iowa while controls from New York City.**

**STEP 7:** Determine if results meaningful enough to change lifestyle, attitudes, or beliefs on the basis of the research.

**Helpful if slowing down the aging process crucial to you.**

## Case Study 6.3: *Drinking, Driving, and the Supreme Court*



### **Craig v. Boren, 429 U.S. 190, 1976:**

- Challenged Oklahoma state law prohibiting sale of 3.2% beer to males under 21 but allowed it to females under 21.
- Laws allowed to use gender-based differences if ‘serve important governmental objectives’ and ‘are substantially related to achievement of these objectives’.
- Defense argued traffic safety was an important governmental objective and data show young males more likely to have alcohol-related accidents than females.
- Supreme Court shown two sets of data.
- Review the data – do you think law should be upheld?

**Source: Gastwirth, 1988, pp. 524-528.**

# Case Study 6.3: *Drinking, Driving, and the Supreme Court*



**TABLE 6.1** Arrests by Age and Sex in Oklahoma, September–December 1973

	MALES			FEMALES		
	18–21	Over 21	Total	18–21	Over 21	Total
Driving under influence	427	4,973	5,400	24	475	499
Drunkenness	966	13,747	14,713	102	1,176	1,278
Total	1,393	18,720	20,113	126	1,651	1,777

**2% of males 18-21**
**0.18% of females 18-21**

**TABLE 6.2** Random Roadside Survey of Driving and Drunkenness in Oklahoma City, August 1972 and August 1973

	MALES			FEMALES		
	Under 21	21 and Over	Total	Under 21	21 and Over	Total
BAC* over .01	55	357	412	13	52	65
Total	481	1926	2407	138	565	703
%BAC over .01	11.4%	18.5%	17.1%	9.4%	9.2%	9.2%

\*BAC = Blood alcohol content

## Case Study 6.3: *Drinking, Driving, and the Supreme Court*



**STEP 1:** Determine if research was sample survey, experiment, observational study, a combination, or based on anecdotes.

**Table 6.1: observational, representing only a subset of those who committed the crimes. Table 6.2: sample survey, based on a convenience sample.**

**STEP 2:** Consider the Seven Critical Components.

**Not told how the ‘random roadside survey’ was conducted.**

## Case Study 6.3: *Drinking, Driving, and the Supreme Court*



**STEP 3:** Review “difficulties and disasters” inherent in that type of research and determine if any of them apply.

**Table 6.1: Males more likely to be stopped for other traffic violations. Table 6.2: drivers questioned at these certain locations may not represent *all* drivers.**

**STEP 4:** Determine if information is complete. If necessary, find original source of report or contact authors for missing info.  
**Relatively complete (except for Step 2).**

**STEP 5:** Ask if results make sense in larger scope of things. If counter, see if a possible explanation from the authors.  
**Nothing suspicious.**

## **Case Study 6.3: *Drinking, Driving, and the Supreme Court***



**STEP 6:** Ask if any alternative explanation for the results.

**Table 6.1: Males more likely to be stopped for other traffic violations. Table 6.2 shows almost 80% of drivers were male. Males more likely driving helps explain why Table 6.1 results so different. Table 6.2 results of 11.4% males versus 9.4% females were statistically indistinguishable.**

**STEP 7:** Determine if results meaningful enough to change lifestyle, attitudes, or beliefs on the basis of the research.

**Supreme Court overturned law concluding Table 6.2 data ‘provides little support for a gender line among teenagers’.**



# Case Study 6.4: *Smoking During Pregnancy and Child's IQ*

## STUDY: SMOKING MAY LOWER KIDS' IQS

ROCHESTER, N.Y. (AP)—Second-hand smoke has little impact on the intelligence scores of young children, researchers found. But women who light up while pregnant could be dooming their babies to lower IQs, according to a study released Thursday. Children ages 3 and 4 whose mothers smoked 10 or more cigarettes a day during pregnancy scored about 9 points lower on the intelligence tests than the offspring of nonsmokers, researchers at Cornell University and the University of Rochester reported in this month's *Pediatrics* journal.

That gap narrowed to 4 points against children of nonsmokers when a wide range of interrelated factors were controlled. The study took into account secondhand smoke as well as diet, education, age, drug use, parents' IQ, quality of parental care and duration of breast feeding.

"It is comparable to the effects that moderate levels of lead exposure have on children's IQ scores," said Charles Henderson, senior research associate at Cornell's College of Human Ecology in Ithaca.

**News Source:** 11 February 1994, p. A-10.

**Original Source:** Olds, Henderson, and Tatelbaum, February 1994, pp. 221-227.

## Case Study 6.4: *Smoking During Pregnancy and Child's IQ*

**STEP 1:** Determine if research was sample survey, experiment, observational study, a combination, or based on anecdotes.

**Observational Study. Smoking behavior observed.**

**STEP 2:** Consider the Seven Critical Components.

**News report too brief. Missing info provided in original report: Supporting grants from many sources not related to tobacco products; participant details (primiparous women, many teenagers, unmarried or poor, mostly white); two groups compared (smoked 10+ cigarettes per day average versus none); IQ measured at 12 months; many potential confounding variables measured and checked; not clear if study was single-blind.**

## Case Study 6.4: *Smoking During Pregnancy and Child's IQ*

**STEP 3:** Review “difficulties and disasters” inherent in that type of research and determine if any of them apply.

**Prospective study. Difference in IQ for two groups reduced from 9 to 4 points when potential measured confounding variables included – there could be others not included, such as maternal report of illegal drug/alcohol use or child's exposure to side-stream smoke. Results may not extend to older mothers or less disadvantaged groups.**

**STEP 4:** Determine if information is complete. If necessary, find original source of report or contact authors for missing info.

**Original report fairly complete.**

## Case Study 6.4: *Smoking During Pregnancy and Child's IQ*

**STEP 5:** Ask if results make sense in larger scope of things. If counter, see if a possible explanation from the authors.

**Authors do speculate on what might be cause.**

**STEP 6:** Ask if any alternative explanation for the results.

**Confounding variables not measured; possible experimenter bias if those measuring IQ were not blind.**

**STEP 7:** Determine if results meaningful enough to change lifestyle, attitudes, or beliefs on the basis of the research.

**If you were pregnant and concerned about your child's IQ, results might lead you to quit smoking during pregnancy.**

# Case Study 6.5: *Guns and Homicides at Home*



## Study Details:

- **Multistate study** of homicides => keeping gun at home nearly triples likelihood that someone in household will be slain there.
- **Records of three populous counties** (sample representative of the entire nation) were **studied**. Looked only at homicides that occurred in homes of victims—**about 400 deaths**.
- Members of households with guns were 2.7 times more likely to experience a homicide than those in households without guns.
- In 77% of cases, victims were killed by a relative or someone they knew. In 4% of cases were victims killed by a stranger. In remaining cases, the identity could not be determined.

**Source: Washington Post, 17–23 October 1993.**