

Expanding our Toolkit:



Considering Manipulation Designs beyond True Experimental Treatments

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Manipulation in Organizational Research: On Executing and Interpreting
Designs from Treatments to Primes. *Organizational Research Methods*

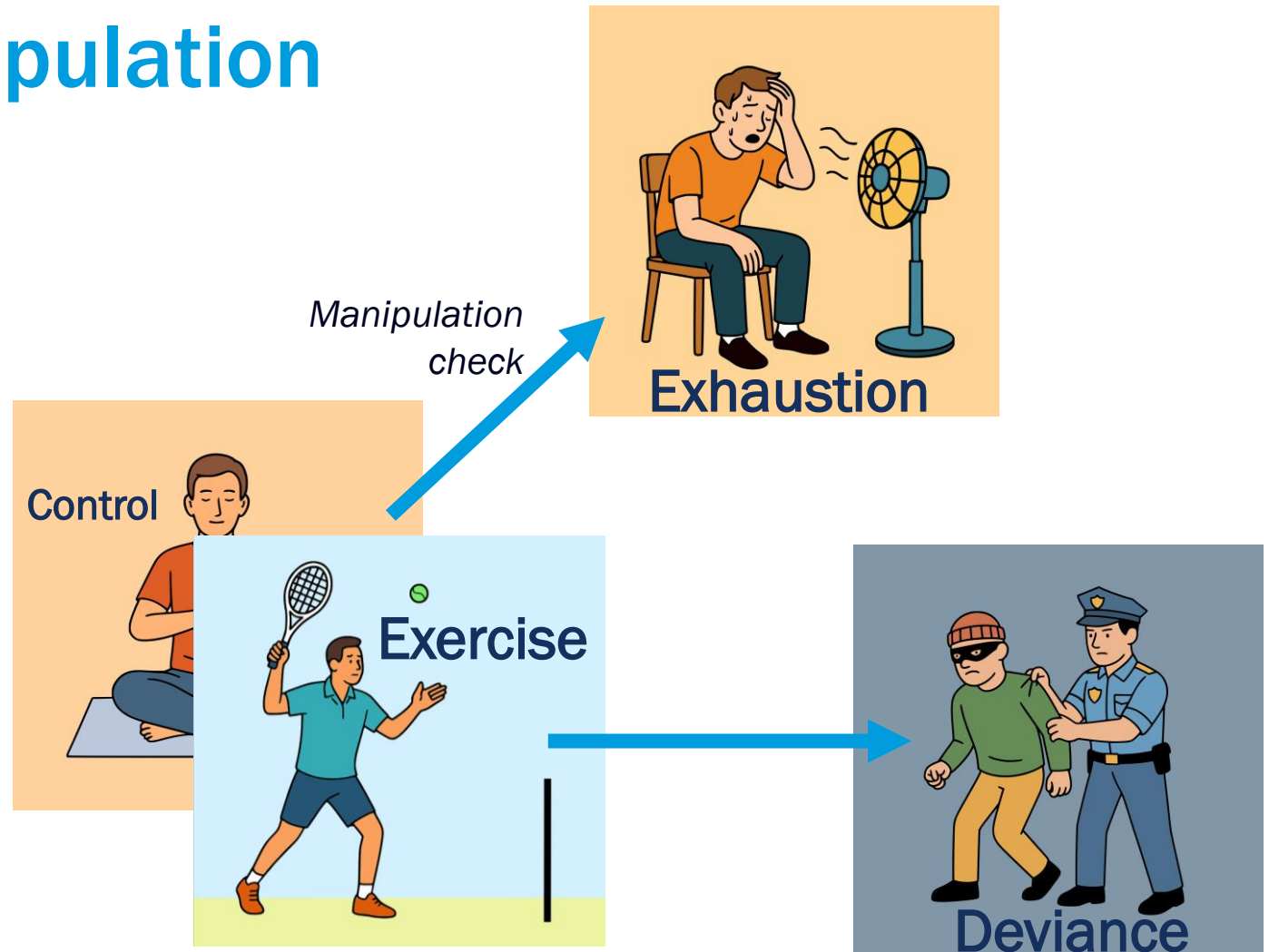
Agenda

- 1) Introduction: Why Distinguish Manipulation Designs?
- 2) Overview of Different Types
- 3) Evidence from the Field
- 4) Best Practices & Recommendations



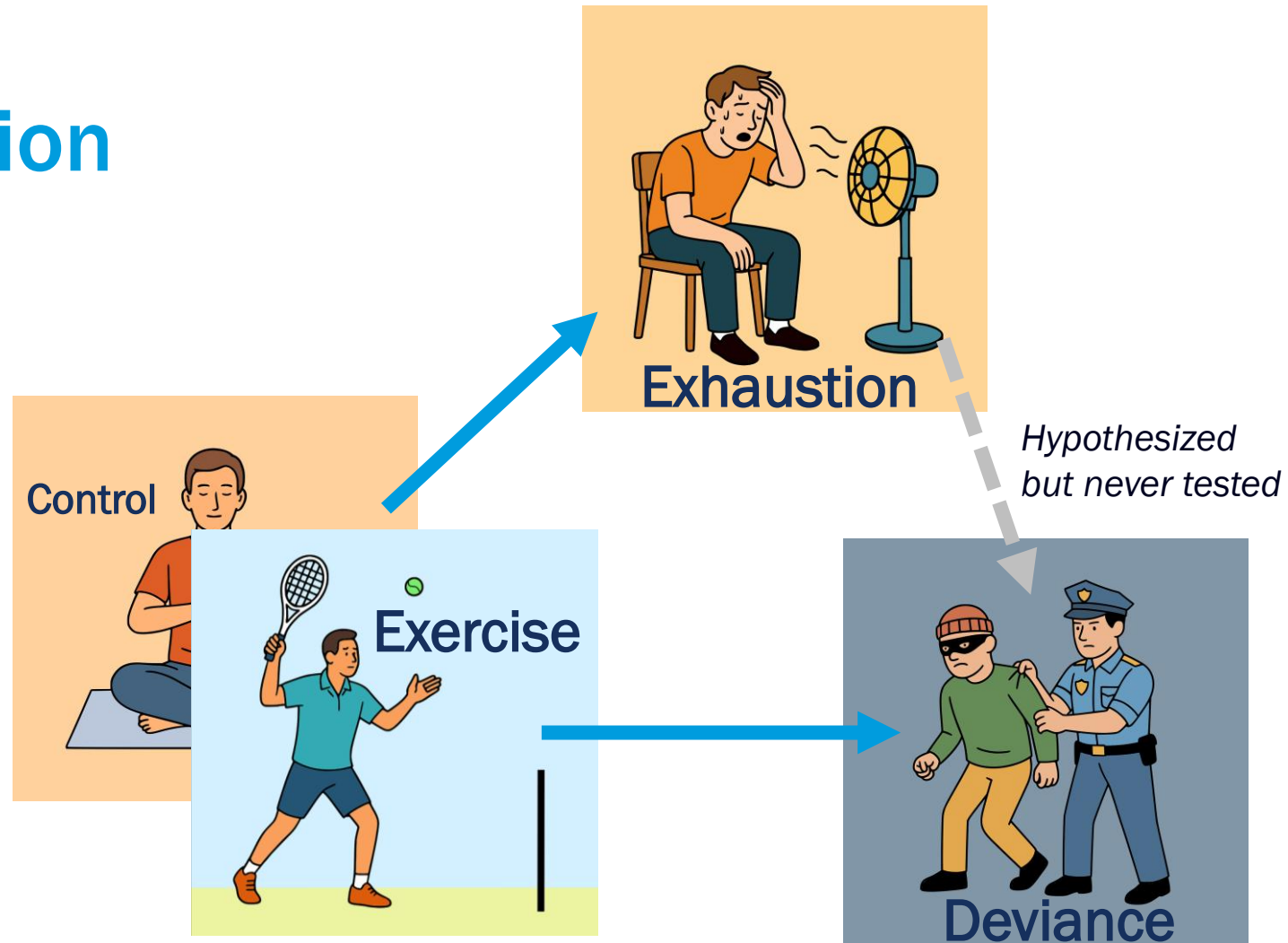
Treatments-type Manipulation

- Experimental design that exposes participants to different levels/types of a manipulation of theoretical interest (Antonakis, 2017; Lonati et al., 2018)
- Imported from the natural sciences (Steffens, 2007), medicine (Gaw, 2009), and economics (Brue & Grant, 2013): e.g. randomized-control trial (RCT)
- Tool for isolating a phenomenon of interest, carefully controlling its expression, and providing a causal test of effects (Shadish et al., 2002)
- Often include manipulation checks (Hauser et al., 2018)



Prime-Type Manipulation

- Manipulations that are not of theoretical interest but generate variance in a state that is.
- Established tool in other social sciences (Oehlert, 2000; O’Keefe, 2003; Welsh et al., 2013)
- Suitable for capturing variance in rare, difficult, or deviant cognitions, emotions, or other psychological states
- The “manipulation check” is the independent variable



Our Backstory

The readers of this study who are well versed in experimental methods will expect that your variable will be treated more like a manipulation check rather than a major variable in your analysis... If you don't adhere to this convention commonly employed in experimental traditions, **your paper might be viewed by that community as flawed or hiding null findings.**

You decided to use the measured scales of [state] rather than the manipulation code. **I think it is better to use the manipulation as the IV...** I will leave it to the editor [and] the other two reviewers on this matter, and encourage them to double check the analytical procedure.



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Introduction

Overview

Field Evidence

Best Practices

Empirical Demonstration: Power Prime

Purpose	- Collected our own data using the power mind-set manipulation (Galinsky et al., 2003) and statistically test the manipulation as a treatment and prime. - Replicate the negative relationship between sense of power and risk propensity (e.g., Anderson & Galinsky, 2006; Keltner et al., 2003; Maner et al., 2007).
Manipulation	Participants were randomly assigned to recall and write about a particular incident in which they had power over another individual (high power condition) or when someone else had power over them (low power condition)
Sample	300 US participants (via Prolific Academic): 52.5% female; 75.4% Caucasian, 13.0% Asian, 6.6% Black. Average age was 34.99 years ($SD = 12.01$). - Participants were paid \$1.00 and took an average of 4 minutes to complete the survey.
Measures	<i>Sense of Power</i>: 8-item scale (Anderson et al., 2005): “I can get people to listen to what I say” and “if I want to, I get to make the decisions” (1= <i>Strongly Disagree</i>, 7 = <i>Strongly Agree</i>; $\alpha = .92$). <i>Risk Propensity</i>: 7-item scale (Meertens & Lion, 2008): “I prefer to avoid risks” and “Safety first” (1 = <i>Totally Disagree</i>, 7 = <i>Totally Agree</i>; $\alpha = .81$).



Empirical Demonstration

Descriptives		Sense of Power		Risk Aversion	
Condition	N	Mean	SD	Mean	SD
Low Power	157	4.15	1.12	5.00	0.98
High Power	144	4.72	0.96	4.99	0.96

	1	2	3
1. Condition			
2. Sense of Power	.26		
3. Risk Aversion	-0.01	-0.11	
4. Age	-0.13	0.11	0.09

Treatment-type analysis: ANOVA

- *Manipulation check (power)*: High power condition ($M = 4.72$, $SD = .96$); Low power condition ($M = 4.15$, $SD = 1.12$); $F(1, 300) = 22.45$, $p < .001$).
- *Hypothesis test (risk aversion)*: High Power $M = 4.99$, $SD = .96$; Low Power $M = 5.00$, $SD = .98$).; $F(1, 300) = .01$, $p = .92$;

Prime-type analysis: OLS regression

- Sense of power has a significant negative effect on risk aversion ($b = -.11$, $\beta = -.12$, $p = .04$) ; marginal without control: ($b = -.10$, $\beta = -.11$, $p = .06$)

Possible explanation: variance constriction

- *High Power condition*: 1.88 to 7.00 ($M = 4.72$)
- *Low Power condition*: 1.63 to 6.63 ($M = 4.15$)
- Both conditions virtually spanned the entire 7-point scale; means represent average, not high or low

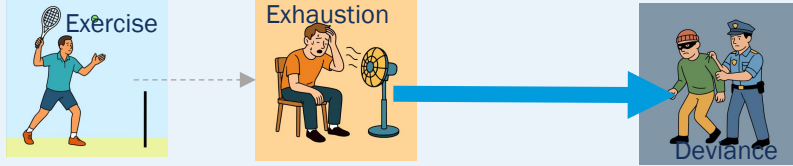


Thesis Statement:

While treatments offer unique advantages, they are not always possible, nor the best fit for a research question.

A non-causal but accurate test of theory is superior to a causal but inaccurate test.

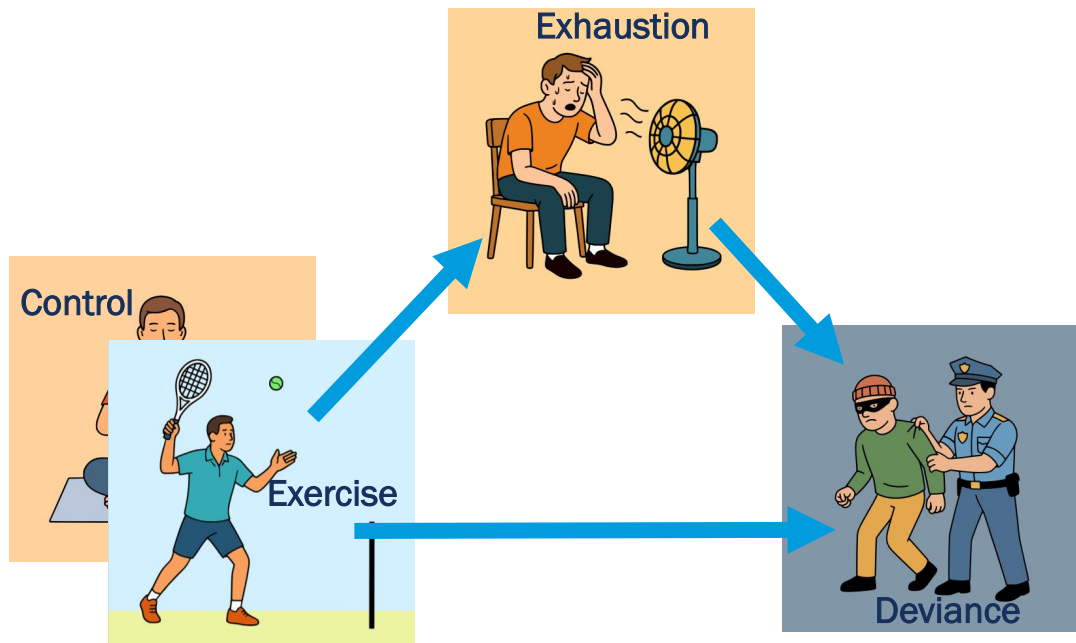
Summary Overview

	Treatments	Primes
Purpose	Isolate phenomenon of interest	Generate variance in states of interest
Design	- Expose participants to manipulated types/levels of an objectively demonstrable stimulus - Conditions function as independent variable	- Expose participants to manipulated types/levels of an objectively demonstrable stimulus - Variation in induced state (emotion, cognition, behavior) functions as independent variable
Analysis	- Comparison of means (e.g., t-tests, ANOVA) - Regression methods using the condition as a categorical predictor variable. 	Analyze the relationship between the measured state variable and the outcome variable using methods that identify association (correlation, regression, etc.). 
Interpretation	Significant differences across stimulus conditions support claims for the effects of the stimulus on the outcome (<i>*given effective randomization, causal claims</i>)	Significant association between the state and outcome variables support claims for the effects of the state on the outcome (<i>*given effective steps taken to address endogeneity and control for confounding factors</i>)

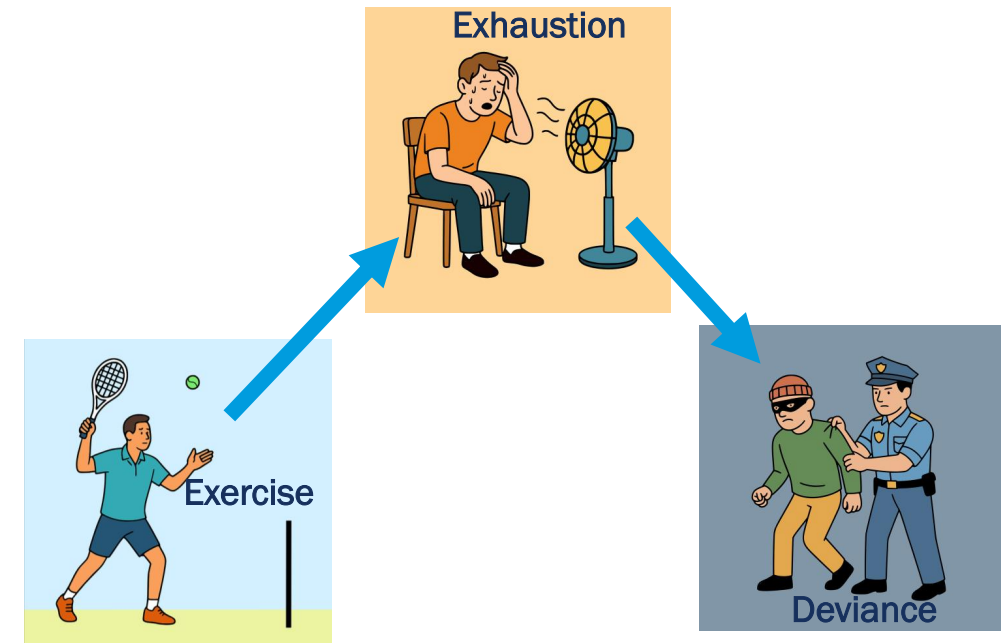


More Derivatizations

Intervention (Treatment)



Invariant Prompt (Prime)



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Summary Overview

	Strengths	Costs
Treatments	• “gold standard” • Can provide a causal test: Isolates a phenomenon of interest and carefully controls its expression • Best means to untangle the “the social science rat’s nest of confounded variables” “(Pinker, 2012, p. 123)	• Not a panacea for bad practice (Lonati et al., 2018) • Internal and statistical validity threats (e.g. inappropriate comparisons, demand effects, incorrect inference) • External and ecological validity threats • Less suitable to probe mechanisms or processes
Primes	• Conceptual fit: the most accurate measure of focal construct • Captures nuanced variance and the full range of state • Useful when states may be hard to capture from a sampling or timing perspective (e.g., hot-button topics) • Useful when participants may be reluctant to self-report in field	• Vulnerable to subjective measures, self-reports, and demand effects problems (just like manipulation checks) • Insufficiently-addressed endogeneity would constitute a fatal flaw (just as it would in all other non-treatment designs) • Assumption of random assignment to stimulus conditions is absent. Never suited to examining causal effects
Interventions	• Suitable to probe immediate and distal effects • Still publishable as stand-alone studies	See Treatments
Invariant Prompts	• Can avoid conditions that might involve harm, feelings of inequity, paternalism, or be culturally inappropriate (like other quasi-experiments; Grant & Wall, 2009; Schein, 2015) • Eliminates concerns about asymmetric demands between treatment and control groups (Lonati et al., 2018). • “take only what you need” paradigm: accessible to resource-constraint scholars; can mitigate participant exploitation (Felstiner, 2011; Samuel, 2018) or subject pool contamination	See Primes



Exemplars

Treatments	- Exposure to partner (happy vs. angry) → information search behaviors (Rees et al., 2020) - Photos displayed (nature vs. strangers vs. family) → unethical behavior (Hardin et al., 2020) - Global crises (financial vs. Covid-19 vs. no crisis) → funding female entrepreneurs (Yu et al., 2024)
Primes	- Intercultural (versus same-culture) dyads to <i>prime</i> conflict → creative collaboration (Chua & Jin, 2020) - Audiences (family, friend, or student) to <i>prime</i> relative status → goal commitment (Klein et al., 2020) - Tasks (anagrams, subjective or probability tasks) to <i>prime</i> future-oriented cognitive processes → recognizing business opportunities (Fredricks et al., 2019)
Invariant Prompts	- Recall a coworker “coming out” to <i>prompt</i> heterosexual identity threat → response (Lyons et al., 2020) - Discuss hot-button issue to <i>prompt</i> “conversational receptiveness” → engagement (Yeomans et al., 2020) - Recall abusive supervision to <i>prompt</i> social worth → job performance (Priesemuth & Bigelow, 2020)
Intervention	- Work-family enrichment training (treatment) through perceptions of work-to-family enrichment (immediate state outcome) → job satisfaction (Heskiau & McCarthy, 2020) - Assigned 40 new Ghanaian cooperatives to control structure (flat or hierarchical; treatment) through collective psychological ownership → conflict (Slade et al., 2020)
Combination	Treatment x Prime: Exercise vs. reading (treatment) while confederate rudely answers call to <i>prime</i> feelings of injustice → DV (Watkins & Umphress, 2020)



Targeted Methodological Content Analysis

5 'big tent' journals spanning micro-, meso-, and macro-research:
Academy of Management Journal, Administrative Sciences Quarterly, Journal of Applied Psychology, Personnel Psychology, and Organizational Behavior and Human Decision Processes.

Sourced all empirical articles (277) published in 2020. Coded all containing at least one manipulation study: 98 articles containing 450 manipulations across 326 studies

Prevalence

Journal	Treatment	Prime	Invariant Prompt	Intervention	Total
Academy of Management Journal	79%	14%	4%	4%	28
Administrative Science Quarterly	70%	10%	20%	0%	10
Journal of Applied Psychology	65%	27%	7%	0%	55
Organizational Behavior and Human Decision Processes	80%	15%	2%	3%	344
Personnel Psychology	46%	46%	0%	8%	13
Overall	77%	18%	3%	2%	450

110 studies (34%) used multiple-manipulation designs: 69 treatment-by-treatment, 20 treatment-by-prime, 13 treatment-by-treatment-by-treatment, 6 prime-by-prime, 1 prime-by-treatment-by-treatment, 1 invariant-prompt-by-prime



Deployment across Types

Stimuli Type	Treatment	Prime	Invariant Prompt	Intervention	N
Behavioral Task	15%	14%	15%	82%	74
Differing Information	21%	6%	0%	9%	79
Differing Instructions	2%	4%	8%	0%	11
Exposure (in-person)	4%	1%	0%	0%	15
Reading Task	11%	11%	8%	0%	48
"Recall a Time"	2%	37%	62%	0%	44
Vignette	43%	14%	0%	0%	160
Video Vignettes	1%	1%	0%	0%	6
Writing Task	1%	11%	8%	9%	13



The Analysis Problem

- 99.5% of reviewed treatments were analyzed as such (i.e., via mean comparisons of condition)
- 5.8% of reviewed primes were analyzed as such (i.e., via associational methods & measured state)

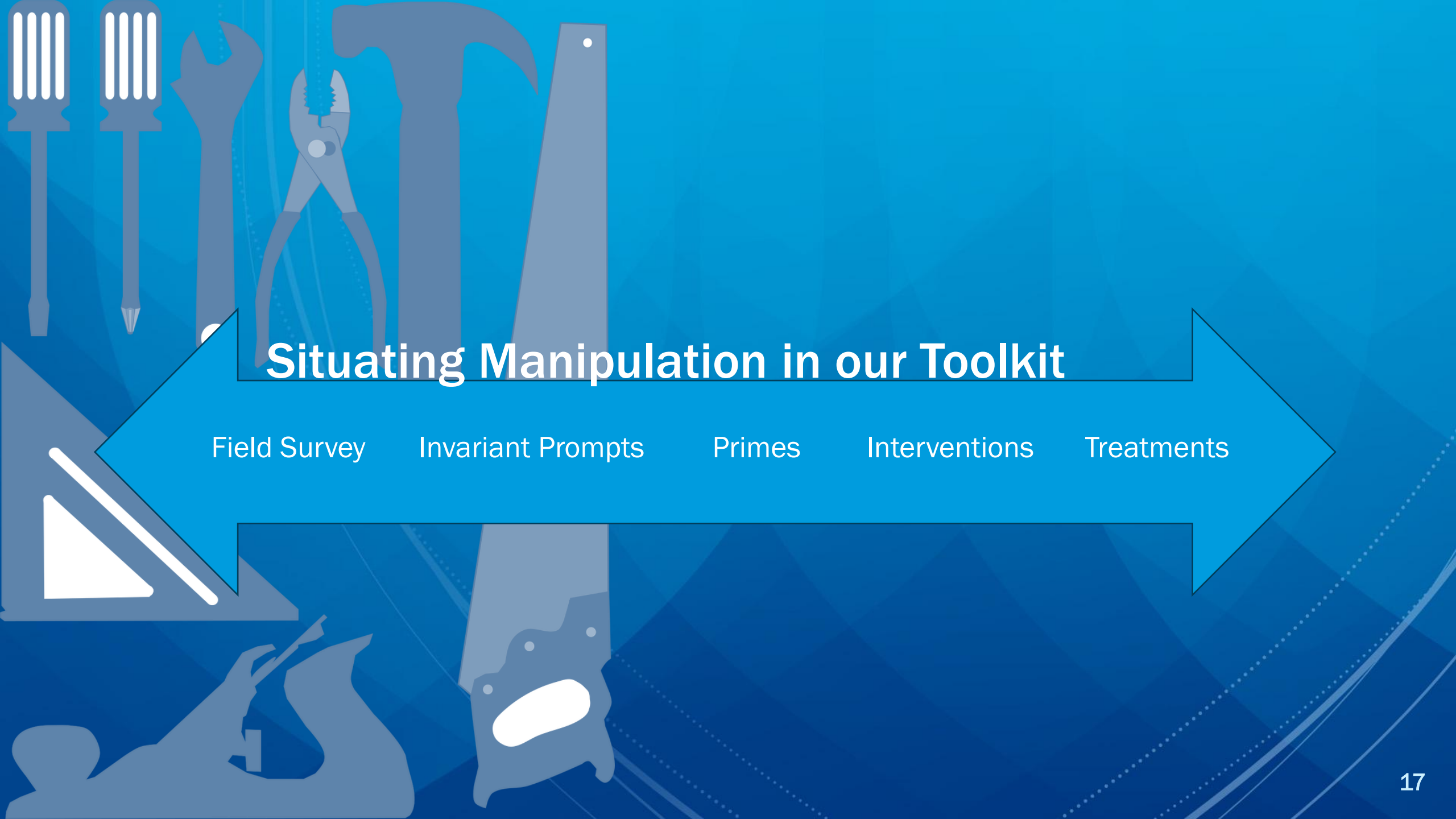
Immediate Costs of Imposing Treatment-type Analyses

- Categorical condition is a subpar proxy for state (Boyd et al., 2013; Gruijters, 2022); Researchers may draw conclusions (however causal) that do not accurately reflect their hypothesis
- The effect of the condition presents different coefficients than what one would observe with the measured variable); Categorical condition constricts the variance in the effect (Irwin & McClelland, 2003)
- Treats variance in unexpected direction as flawed (i.e. outlier problem); promotes possible misinterpretation of results arising from the suppression of a significant prime-outcome relationship (Type II error)

Downstream Costs of Imposing Treatment-type Analyses

- Researchers may abandon “failed” primes (file-drawer problem)
- Researchers may re-run studies until they “work” as treatments (replication crisis)
- May impact future research: replications, meta-analyses etc





Situating Manipulation in our Toolkit

Field Survey

Invariant Prompts

Primes

Interventions

Treatments

Best Practices

Treatments (and derivations)	Primes (and derivations)
• Manipulation should be objective in nature; behavioral whenever possible (Banks et al., 2023) • Closely match the conditions to the concepts they represent (Bacharach, 1989) • Ensure manipulation can be judged to have occurred (e.g. include confederate observation, attention check etc.) • Theoretical fit > convenience	• Avoid any causal inferences: A prime is never a true experiment • Address issues of endogeneity, common method variance, and alternative explanations (e.g. include control variables, instrumental variable techniques); Address self-report issues: account for social desirability, avoid asymmetric conditions, incorporating experimenter blinding protocols, prioritize unobtrusive manipulations • Treat primes as primes: e.g. resist pressure to address “outliers”: In a prime, any variance is a boon • Theoretical fit > convenience



Best Practices: Using Manipulations



A Priori Planning: Choose the appropriate manipulation to fit your research question at the outset (i.e. think power analysis before deciding on a sample size)

Never change strategy in response to non-significant results (*except perhaps in cases of “quasification” in field experiments, see Eden 2017; King et al., 2013)



Best Practices: Using Manipulations



Contextualize and Complement: Consider each manipulation study in the context of the larger manuscript.

Justify and explain when and why you deploy different designs:

- Treatments may pair well with inductive efforts in test-and-explore (Wellman et al., 2023).
- Primes may offer first twist on full-cycle approaches (Chatman & Flynn, 2005)
- Invariant prompts may work in generalization-and-extension packages (Tsang & Kwan, 1999)



Best Practices: Using Manipulations



Transparent Communication: Common nomenclature is crucial bridging language within our “big tent” field and across the sciences/practice divide

Name manipulations to ease interpretation, simplify methods write-ups, facilitate meaningful extension, and offer language to critics

Share as much of your data and design as possible



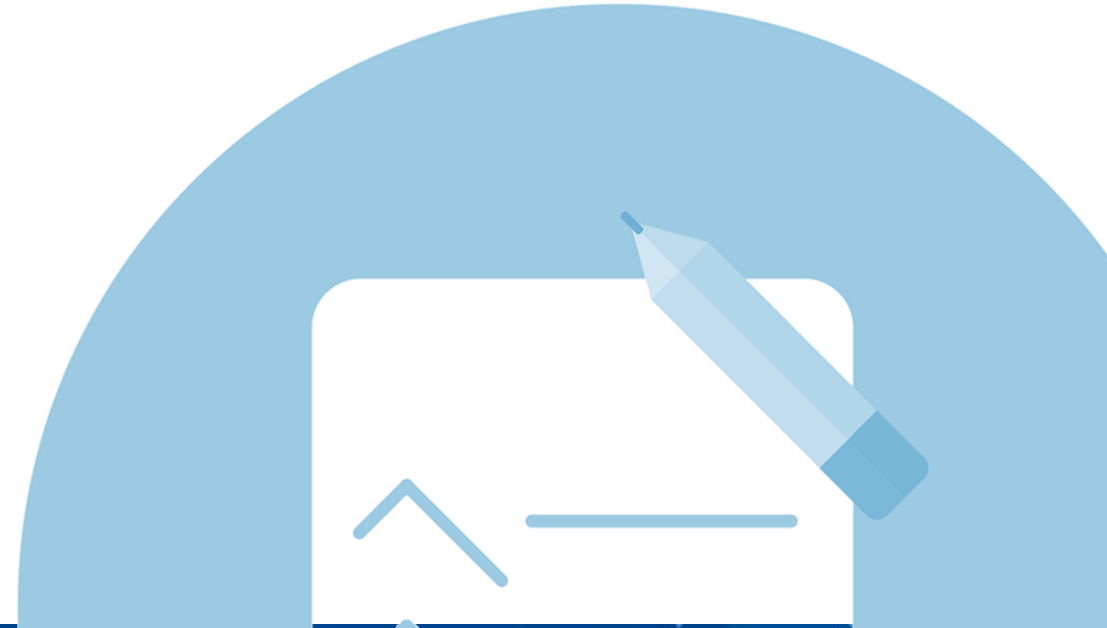
Final Caveats

Our core aim was to conceptually and philosophically disentangle the ways that manipulations are and could be used in our field

We do not offer a comprehensive review of methods:

- experimental methods (e.g. Lonati et al., 2018)
- quasi-experimental methods (e.g. Grant & Wall, 2009)
- or both (e.g. Shadish et al., 2002)
- addressing endogeneity (e.g., Bastardo et al., 2023; Sajons, 2020)
- including manipulation checks (Hauser et al., 2018)

Our intention is never to advocate for (or against) any manipulation design



Thank you

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Regular Submission

Manipulation in Organizational Research: On Executing and Interpreting Designs from Treatments to Primes

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Abstract

While other applied sciences systematically distinguish between manipulation designs, organizational research does not. Herein, we disentangle distinct applications that differ in how the manipulation is deployed, analyzed, and interpreted in support of hypotheses. First, we define two archetypes: *treatments*, experimental designs that expose participants to different levels/types of a manipulation of theoretical interest, and *primes*, manipulations that are not of theoretical interest but generate variance in a state that is. We position these and creative derivations (e.g., interventions and invariant prompts) as specialized tools in our methodological kit. Second, we review 450 manipulations published in leading organizational journals to identify each type's prevalence and application in our field. From this we derive our guiding thesis that while treatments offer unique advantages (foremost establishing causality), they are not always possible, nor the best fit for a research question; in these cases, a non-causal but accurate test of theory, such as a prime design, may prove superior to a causal but inaccurate test. We conclude by outlining best practices for selection, execution, and evaluation by researchers, reviewers, and readers.

Keywords

experimental design, quasi-experimental design, manipulation, treatment, prime, invariant prompt, intervention

Manipulations represent a dominant paradigm for studying behavior in organizations. In their classic application—commonly termed a “treatment” (Antonakis et al., 2010; Campbell & Stanley, 1967)—researchers randomly expose participants to different types or levels of an objectively demonstrable

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