Designing extensions for replications Collaborative guide

Link to guide: https://mgto.org/extensionsguide

Developed by Gilad Feldman (giladfel@gmail.com) at University of Hong Kong psychology department for the HKU mass pre-reg JDM replication project.

Guidelines for contribution

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Please add your name here and the section/change you contributed.

Contents

Introduction

This document is meant to serve as a collaborative guide for designing extensions for replications. Be sure to read the complimentary guide on running pre-registered replications, especially the section on "Design".

General extension guidelines

Types of extensions and priority

Replication projects are expected to extend the classic replications by adding 1 simple extension to the replication studies to add additional insights that go beyond the original article.

This must involve one of the following types of extensions:

1. Additional dependent variables (DV): The added dependent variables will be either about evaluations/attributions/judgments/emotions regarding the scenarios/vignettes presented or present participants with a choice related to the presented scenario.

   The below example is based on the replication-extension of Rottenstreich and Hsee (2001). Regarding choice related DVs, there can be three types: i) simple binary choice, which can be analyzed with chi-square statistics, for example, meeting a star versus cash, ii) single item scale, for example, 1 = highest preference for meeting a star to 7 = highest preference for cash lottery, which can be analyzed with one-sample t-tests against the midpoint, iii) separate item scale, for example, whether participants like the two options.

   For example, rate how much you like meeting a star option (0 - *not at all*; 6 - *very much*), and how much you like the cash lottery (0 - *not at all*; 6 - *very much*), which can be analyzed with ANOVA. If the original adopts i) as DV, you may add ii) or iii) as options. If the original adopts iii) as DV, you may add i) as the extension DV.

2. Additional condition(s) for IV That means make slight changes to the scenario presented: The added conditions should pose no harm to participants going beyond the replication materials.

   For example, adding a control/neutral condition to a replication in which the original experimental design did not include control/neutral conditions.

   In the extension on ostracism research, there could be another neutral condition, along with the original "exclusion condition" and "acceptance condition".

3. Potential moderator(s) That means adding additional variables that could work together or interact with the original IV.

   For example, well-known and validated individual difference scales at the beginning of the survey (e.g., belief in free will, Rakos et al., 2008) as predictors of the effect (independent variables; IV) in a correlation study. For Judgment and Decision Making, you may refer to this comprehensive list of scales here: http://www.sjdm.org/dmidi/

(more detail on these 3 types below)

Important notes:

The types above are ordered in level of priority. I strongly recommend you prioritize type 1 extension first (additional DV), type 2 extension second, and really last priority, only if the other two aren't possible, then type 3 extension. Please also check the "Extensions to Avoid" section below.

Extensions should be small in their adjustments but potentially meaningful in their impact. Do not try to reinvent the experiment or design a new follow study. Keep to the original design and change one small detail. The smaller and the more meaningful, the better. Small changes can have a very big impact and lead to remarkable insights.

Extensions should be very specific and detailed. Refrain from vague generalized statements. This means that you should have a clear directional hypothesis, for example, using words like "higher" and "lower" to compare the conditions/groups, or "positively associated" and "negatively associated" for correlations.

Please provide a table with both replication hypotheses and the extension hypothesis. See Table 1 below for an example taken from Ziano et al. (2020) (p. 2). Moreover, please provide rationale of your extensions, with citations to theories/concepts/prior findings in the literature.

Table 1

Summary of replication and extension hypotheses

Replication Hypotheses		
	1	The difference between evaluation of self and others is higher as traits increase in desirability.
	2	Among high desirable traits, self-ratings are higher than other-ratings for high controllable traits than for low-controllable traits, whereas among low-desirable traits, self-ratings are higher than other-ratings for low-controllable traits than for high-controllable traits.
Extension Hypothesis		
	3	For ratings of others, trait desirability is positively associated with trait commonness. For ratings of self, trait desirability is negatively associated with trait commonness.

Please provide extension design tables. It is sometimes difficult to understand an extension design simply based on text. A clear table with the conditions and the dependent variables would facilitate feedback and peer reviews from the instructor, teaching assistants, your peers and external peer reviewers, as we can understand your design better. Check below for table templates.

Use the template provided below

Technical notes

1. IRB/ethics: Added extensions must pose no harm to participants going beyond the replication materials.
2. Target sample: Extensions should match the target sample (e.g., online American Amazon Mechanical Turk or British on Prolific Academic)
3. Online Qualtrics questionnaire: Extensions should be added to the replication Qualtrics questionnaire.

Extensions to avoid

Unless there's a strong theoretical reason to, I suggest you **do not** make your extensions about:

1. Reaction time, or complicated things that are hard to measure or control well with Qualtrics and when administering online.
2. Avoid obvious gender/age and obvious demographics or cultural differences. Try to make this about the main hypothesis of interest and embedded in the literature of the target article for replication.
3. If the original article has an individual difference predictor, avoid adding another individual difference predictor.
4. Avoid three-way interactions, as such analyses require very large sample size, with much more complicated power analyses, sample size calculations, and effect size calculations.
5. Avoid adding additional independent variable(s) or individual difference predictor(s) that may confound the independent variable of the original article.

Example1: 1 IV/2 conditions/Between - Action effect

[experimental1 versus experimental2 - action versus inaction]

Extension: Adding a predictor of individual differences

Prediction: Action-state orientation will predict differences in regret attributions to action and inaction, such that those more action-oriented will tend to associate inaction with more regret and action with less regret, whereas those state (inaction)-oriented will tend to associate action with more regret and inaction with less regret.

<table>
<tr><td colspan="2"><u>Individual differences</u>
Predictor: Action-state orientation scale (Diefendorff et al., 2000, JAP)</td></tr>
<tr><td><u>IV1: Experimental 1 condition</u>
Title example: Taking action condition
Manipulation example: Investor scenario described as having taken action (switched) and resulted in loss of money (20%)</td><td><u>IV1: Experimental 2 condition</u>
Title example: Inaction condition
Manipulation example: Investor scenario described as not having taken action (not switched) and resulted in loss of money (20%)</td></tr>
<tr><td colspan="2"><u>Dependent variable</u>
Title example: Feelings of regret
Specific DV item: Please rate investor's feelings of regret on scale of 0-6 (no regret to very strong regret)</td></tr>
</table>

How to analyze

Typically, continuous predictors of results in an experiments are done using an ANCOVA (see video on how to run that on JAMOVI for an example).

Extension: Adding Independent Variables (IVs)

Prediction: both feelings of joy and regret will be affected by action-inaction (although the literature is mixed on that), such that action will be associated with more regret in loss and more joy in gain, compared to inaction.

<table>
<tr><td>IV1: Action-inaction

IV2: Gain/loss manipulation</td><td><u>IV1: Experimental 1 condition</u>

Title example: Taking action condition

Manipulation example: Investor scenario described as having taken action (switched) and resulted in loss/gain of money (20%)</td><td><u>IV1: Experimental 2 condition</u>

Title example: Inaction condition

Manipulation example: Investor scenario described as not having taken action (not switched) and resulted in loss/gain of money (20%)</td></tr>
<tr><td><u>IV2: Experiment A condition</u>

Title example: original loss condition</td><td colspan="2"><u>Dependent variable</u>

Title example: Feelings of regret

Specific DV item: Please rate investor's feelings of regret on scale of 0-6 (no regret to very strong regret)</td></tr>
<tr><td><u>IV2: Experiment A condition</u>

Title example: gain condition

Manipulation example: Outcome is positive</td><td colspan="2"><u>Dependent variable</u>

Title example: Feelings of joy

Specific DV item: Please rate investor's feelings of joy on scale of 0-6 (no joy to very strong joy)</td></tr>
</table>

Extension: Adding dependent variable

Prediction: People would tend to rate social norms as inaction rather than action (compared to a 50-50 random choice split)/

IV1: Experimental 1 condition	**IV1: Experimental 2 condition**
Title example: Taking action condition Manipulation example: Investor scenario described as having taken action (switched) and resulted in loss of money (20%)	Title example: Inaction condition Manipulation example: Investor scenario described as not having taken action (not switched) and resulted in loss of money (20%)
Dependent variables Title example: Feelings of regret Specific DV item: Please rate investor's feelings of regret on scale of 0-6 (no regret to very strong regret) Title example: **Perceptions of social norm** Specific DV item: Please rate what you think most people would do in that situation (0: inaction; 1: action.	

Example2: 1 IV/2 conditions/Between - Exceptionality effect

Baseline replication design

The following example was used in the “fundamentals of social psychology” PSYC2020 class in October 3rd, 2019:

Students were presented with an in-class experiment, with two different versions, version A and B handed out randomly to different students.

Version A:

> Two convenience stores are located in Mr. Paul’s neighborhood. He frequents Store A more regularly than Store B.
>
> Last night he visited Store A.
>
> He walked in on a robbery taking place at the store, and was shot. He lost the use of his right arm as a result of the gunshot wound.
>
> Assume there was no compensation given to Mr. Paul.
>
> **How much regret does he feel about visiting store A**?
>
> - no regret (0)
> - weak regret (1)
> - medium regret (2)
> - strong regret (3)
> - very strong regret (4)

Version B:

> Two convenience stores are located in Mr. Paul’s neighborhood. He frequents Store A more regularly than Store B.
>
> Last night he visited Store B because he wanted a change of pace.
>
> He walked in on a robbery taking place at the store, and was shot. He lost the use of his right arm as a result of the gunshot wound.
>
> Assume there was no compensation given to Mr. Paul.
>
> **How much regret does he feel about visiting store B**?
>
> - no regret (0)
> - weak regret (1)
> - medium regret (2)
> - strong regret (3)
> - very strong regret (4)

Reproducing replication design

First task was to write down the experimental design of that class experiment in this template:

What is the experimental design of Part 2? Between or within?

What is the IV? What is the DV? (IV: Independent variable; DV: Dependent variable)

IV1: Experimental condition 1 (between/within) Condition title: _____ What was manipulated? (copy only the text different from Condition2) _____ _____	**IV1: Experimental condition 2 (between/within)** Condition title: _____ What was manipulated? (copy only the text different from Condition2) _____ _____
DV1: Dependent variable Measure name: _____ Specific DV item (write the question): _____ _____	

To which the provided answer was:

IV1: Experimental condition 1 (between)	**IV1: Experimental condition 2 (between)**
Condition title: Routine	Condition title: Exceptional
What was manipulated? (copy only the text different from Condition2)	What was manipulated? (copy only the text different from Condition2)
Last night he visited Store A.	Last night he visited Store B because he wanted a change of pace.

DV1: Dependent variable

Measure name: Regret

Specific DV item (write the question):

DV in IV1: How much regret does he feel about visiting store A?

DV in IV2: How much regret does he feel about visiting store B?

Scale in both:

no regret (0); weak regret (1) ; medium regret (2) ; strong regret (3) ;very strong regret (4)

Three types of extensions

Instructions:

Now that you understand the design, discuss extensions with your neighbor(s):

Adding <u>an individual difference scale</u> before replication.

What individual differences can predict differences in regret following exceptionality?

_____

Adding <u>another condition</u> beyond exceptionality/routine.

What condition can we add with ever so slightly modification of one of the existing conditions?

_____

Adding an <u>additional dependent variable measure</u> after the regret measure?

What other variable - not regret - do you think is affected by the exceptional/routine differentiation?

_____

Extension table format

And format it into the following extensions table:

Assume that all your extensions above are good enough, please add those to your study design table from Part 3:

<table>
<tr><td colspan="3"><u>Individual differences</u>
Predictor: ADD YOUR PREDICTOR HERE -</td></tr>
<tr><td><u>IV1: Experimental condition 1 (between/within)</u>
SAME AS PART 3 - DO NOT CHANGE</td><td><u>IV1: Experimental condition 2 (between/within)</u>
SAME AS PART 3 - DO NOT CHANGE</td><td><u>IV1: Experimental condition 3 (between/within)</u>
[your new IV condition]
Condition title:
_____
What to manipulate? (only the text different from Conditions 1/2)
_____
_____
_____</td></tr>
<tr><td colspan="3"><u>DV1: Dependent variable 1</u>
SAME AS PART 3 - DO NOT CHANGE</td></tr>
<tr><td colspan="3"><u>DV2: Dependent variable 2</u>
[your new DV]
Measure name: _____
Specific DV item (write the question):
_____
_____</td></tr>
</table>

With the following sample answer:

Extensions: Adding all three types

<table>
<tr><td colspan="3"><u>Individual differences</u>
Predictor: Action-state orientation scale (Diefendorff et al., 2000, JAP)</td></tr>
<tr><td><u>IV1: Experimental condition 1 (between/within)</u>
SAME AS PART 3 - DO NOT CHANGE</td><td><u>IV1: Experimental condition 2 (between/within)</u>
SAME AS PART 3 - DO NOT CHANGE</td><td><u>IV1: Experimental condition 3 (between)</u>
Condition title:
Exception but no control

Last night he visited Store B because Store A was closed.</td></tr>
<tr><td colspan="3"><u>DV1: Dependent variable 1</u>
SAME AS PART 3 - DO NOT CHANGE</td></tr>
<tr><td colspan="3"><u>DV2: Dependent variable 2</u>
Measure name: Compensation
Specific DV item (write the question):
How much compensation should Paul be awarded for his loss by the store's insurance company?
(numerical answer, log transformed to normalize)</td></tr>
</table>

Example 3: 1 IV/2 conditions/Within - Dictator Game

Baseline replication design

The following example was used in the “fundamentals of social psychology” PSYC2020 class in October 10th, 2019:

Students were presented with an in-class experiment, with two different versions, version A and B both given to the same students (within design).

Part a: **Dictator (giving)** game - the classic

Dictator giving game description: the first player, "the dictator", determines how to split an endowment (cash prize) between himself and the second player, the recipient has no influence over the outcome of the game.

As a ‘**dictator**: Decide how much you would dictate **splitting** 100HKD between yourself and another classmate. Remember the other classmate (the **dictated**) must **accept** your decision.

_____ (0-100HKD)

Part b: **Dictator (taking)** game - a variation

Dictator taking game description: a second player gets an endowment (cash prize) from the experimenter. The first player, "the dictator", determines how much to take from the second player. The second player must give the first player what he/she dictated.

As a ‘**dictator**: Decide how much you would dictate **taking** from the 100HKD given to another classmate. Remember the other classmate (the **dictated**) must **give** you what you dictated.

_____ (0-100HKD)

Reproducing replication design

What is the experimental design of Experiment 1 Parts A and B? Between or within?

What is the IV? What is the DV? (IV: Independent variable; DV: Dependent variable)

IV1: Experimental condition 1 (between/within)	**IV1: Experimental condition 2 (between/within)**
Condition title: _____ What was manipulated? (copy only the text different from Condition2) _____	Condition title: _____ What was manipulated? (copy only the text different from Condition1) _____
DV1: Dependent variable Measure name: _____ Specific DV item (write the question): _____	

What is your prediction? Write down your hypothesis with direction:

DV in Condition 1 will be [larger than / about-same / smaller than] DV in Condition 2.

[After results:] Was your hypothesis supported? **YES / NO**

Dictator game Replication Design Table

IV1: Experimental condition 1 (within)	**IV1: Experimental condition 2 (within)**
Condition title: Dictator (giving) game What was manipulated? (copy only the text different from Condition2) Decide how much you would give of the 100HKD to another classmate. Remember the other classmate (the dictated) must accept your decision.	Condition title: Dictator (taking) game What was manipulated? (copy only the text different from Condition2) Decide how much you would take from the 100HKD given to another classmate. Remember the other classmate (the dictated) must give you what you dictated.
DV1: Dependent variable Measure name: Dictator's money Specific DV item (write the question): **DV in condition 1:** Dictator **gives** to the dictated (reversed: 100-X) **DV in condition 2**: Dictator **takes** from the dictated Scale in both: (0-100HKD)	

Thinking of three types of extensions

Now that you understand the design, discuss extensions with your neighbor(s):

Adding <u>another condition</u> beyond the current condition1-condition2.

What other condition can we add with ever so slightly modification of one of the existing conditions?

_____

_____

Adding an <u>additional dependent variable measure</u> after the decision?

What other variable do you think is affected by the differences between condition 1 & condition 2?

_____

_____

Thinking of two types of extensions

Assume that all your extensions above are good enough, please add those to your study design table from Part d:

IV1: Experimental condition 1 (between/within) *SAME AS PART 3 - DO NOT CHANGE*	**IV1: Experimental condition 2 (between/within)** *SAME AS PART 3 - DO NOT CHANGE*	**IV1: Experimental condition 3 (between/within)** [your new IV condition] Condition title: _____ What to manipulate? (only the text different from Conditions 1/2) _____
DV1: Dependent variable 1 *SAME AS PART 3 - DO NOT CHANGE*		
DV2: Dependent variable 2 [*your new DV*] Measure name: _____ Specific DV item (write the question): _____ _____		

Extensions: Adding two types

IV1: Experimental condition 1 (between/within) *SAME AS PART 3 - DO NOT CHANGE*	**IV1: Experimental condition 2 (between/within)** *SAME AS PART 3 - DO NOT CHANGE*	**IV1: Experimental condition 3 (within)** [your new IV condition] Condition title: Public Dictator (giving) game What to manipulate? (only the text different from Conditions 1/2) Decide how much you would give of the 100HKD to another classmate. Remember the other classmate (the dictated) must accept your decision. **but this is done in class in front of everyone**
DV1: Dependent variable 1 *SAME AS PART 3 - DO NOT CHANGE*		
DV2: Dependent variable 2 [*your new DV*] Measure name: Fairness importance Specific DV item (write the question): How important is it to be fair in this game? or How important is fairness to the dictator? (0 - not at all; 6 - very important)		

Adding items (like DVs)

It's generally best to rely on well validated measures and scales from the literature, so search the literature for that.

If you must come up with new items, we'll need to work at it together, but it is a far more complex task than most think.

You'll need to at least think of and specify:

Table 1. *Questions to promote transparency of measurement practices*

Question	Information to transparently report
What is your construct?	Define construct Describe theories & research supporting the construct
How do you operationalize your construct?	Describe measure and administration procedure Match measure(s) to construct(s)
Why do you select your measure?	Justify measure selection Report existing validity evidence
How do you quantify your measure?	Describe response coding & transformation Describe items/stimuli per score Describe calculation of score Describe all conducted (e.g. psychometric) analyses
Do you modify the measure? If so, how and why?	Describe any modifications Describe if modifications occurred before or after data collection Provide justification for modifications
Do you create the measure on the fly?	Justify why you do not use an existing measure Report all measurement details listed above Describe all available validity evidence and if there is no evidence, report that

Note. From Flake & Fried (2019). Measurement Schmeasurement: Questionable Measurement Practices and How to Avoid Them

Here are a other few readings that might be relevant:

- Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in public health*, 6, 149.
- Schwarz, N. (1999). Self-reports: how the questions shape the answers. *American psychologist*, 54(2), 93.
- Wolf, M. G., Ihm, E. D., maul, a., & Taves, A. (2019, July 23). Survey Item Validation. https://doi.org/10.31234/osf.io/k27w3

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Rakos, R. F., Laurene, K. R., Skala, S., & Slane, S. (2008). Belief in free will: Measurement and conceptualization innovations. *Behavior and Social Issues, 17*(1), 20-40. https://doi.org/10.5210/bsi.v17i1.1929

Rottenstreich, Y., & Hsee, C. K. (2001). Money, kisses, and electric shocks: On the affective psychology of risk. *Psychological science, 12*(3), 185-190. https://doi.org/10.1111/1467-9280.00334

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