Step-by-Step Protocol for the Registered Replication Report of Strack, Martin, & Stepper (1988)

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In a seminal article, Strack, Martin, and Stepper (1988; henceforth SMS) tested the *facial feedback hypothesis*. This hypothesis holds that people's affective responses are guided in part by their own facial expressions. SMS used a method where participants were induced to produce a facial expression (e.g., smiling, pouting) that is usually associated with a particular emotional state (e.g., happiness, discontent). Crucially, during the experiment participants were not aware of the association between the facial expression and the associated emotional state. Subsequently, SMS measured the effect of the facial expression and found that different expressions caused different affective judgments. Specifically, SMS had participants rate the funniness of cartoons with a pen that participants had to hold either with their teeth (inducing a facial expression similar to smiling) or with their lips (inducing a facial expression similar to pouting). Consistent with the facial feedback hypothesis, the cartoons were rated most funny in the teeth condition and least funny in the lips condition.

SMS has been cited 1055 times (Google Scholar, 2014, December 3) and is commonly discussed in introductory psychology courses. However, despite the fact that the facial feedback hypothesis is supported by a number of additional studies (e.g., Kraft & Pressman, 2012, *Psychological Science*; Larsen, Kasimatis, & Frey, 1992, *Cognition & Emotion*; Soussignan, 2002, *Emotion*) the experiment itself has not been replicated directly (i.e., using the same design and the same dependent variable). Replications of this experiment are relatively straightforward to carry out, by following the step-by-step protocol provided below.

Original Article

Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: a nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, *54*(5), 768-777. http://dx.doi.org/10.1037/0022-3514.54.5.768

References

Kraft, T. L., & Pressman, S. D. (2012). Grin and bear it: the influence of manipulated facial expression on the stress response. *Psychological Science*, *23*(11), 1372-1378. http://dx.doi.org/10.1177/0956797612445312

Larsen, R. J., Kasimatis, M., & Frey, K. (1992). Facilitating the furrowed brow: An unobtrusive test of the facial feedback hypothesis applied to unpleasant affect. *Cognition & Emotion*, *6*(5), 321-338. http://dx.doi.org/10.1080/02699939208409689

Soussignan, R. (2002). Duchenne smile, emotional experience, and autonomic reactivity: A test of the facial feedback hypothesis. *Emotion*, *2*(1), 52-74. http://dx.doi.org/10.1037/1528-3542.2.1.52

Sample size

N ≥ 100, with n ≥ 50 in each of the two conditions. Participating labs must state their stopping rule and target sample size in advance of data collection.

Materials

The following items are needed to conduct the experiment.

- **A cubicle**. For the purpose of this study, a cubicle is defined as a testing station arranged so that a participant cannot see or hear any other participant and cannot see any of the testing materials for other participants. A cubicle can be a separate room or a divided space.

- **A computer**. Instructions are presented on a computer using the provided presentation file that is available in multiple formats (e.g., PowerPoint) at https://osf.io/pkd65/. The videos used in the presentation file are available in English (pouting https://osf.io/mxrde/; smiling: https://osf.io/aiw6h/) and in Dutch (pouting: https://osf.io/czxmd/; smiling: https://osf.io/5nuiw/) Note: You can change the file format to best suit your software setup, but you may not change the file content. If you are testing in a language other than English or Dutch, you will need to translate these instructions and you will need Editor approval for these translations.

- **Informed consent forms**. An example of an informed consent form is provided in English (https://osf.io/rzfu3/) and in Dutch (https://osf.io/e2gjm/), but each lab must obtain ethics board approval from their own institution and must meet their institution's standards for informed consent.

- **Printed information brochures**. These brochures contain the cover story (i.e., the task instructions). On each brochure is a unique participant number so that participants can be assigned to conditions based on whether the participant number is odd or even. Odd numbered participants are assigned to the pout condition, and even numbered participants are assigned to the smile condition. The information brochures are available in English (https://osf.io/q4iyv/) and in Dutch (https://osf.io/takdv/). If you are testing in a language other than English or Dutch, you will need to translate these materials and you will need Editor approval for these translations.

- **Task booklet**. The task booklet is used to conduct the experiment. Several sections of the booklet are available in English (https://osf.io/wrg38/) and in Dutch (https://osf.io/rcfv6/). The complete booklet will be made available to labs when they are approved to participate. If you are testing in a language other than English or Dutch, you will need to

translate these materials and you will need Editor approval for these translations. You are allowed to include extra measures (e.g., possible moderators or covariates) to the end of the task booklet, but only if these measures do not influence participants' performance on the primary tasks, and only after Editor approval.

- **Practice task sheets**. This task allows participants to gain experience holding the pen appropriately. You should have multiple copies available for each participant. The practice task materials are available in English (https://osf.io/dima2/) and in Dutch (https://osf.io/4efjc/).

- **Pens**: labs are free to choose any black fine tipped marker that can write with relatively little pressure and is easy to hold with both grips (between the teeth and between the lips). Pens that we have tested and work fine are the Stabilo Pen68 (http://www.stabilo.com/com/product/324/coloring/stabilo-pen-68, you can order them here or look for other stores in your region: https://www.artsupplywarehouse.com/prodDetail.php?id=18325 or at http://www.amazon.co.uk/Stabilo-68-46-Fibre-Tip Black/dp/B002GJJ5JU/ref=sr_1_1?ie=UTF8&qid=1428674009&sr=8-1&keywords=stabilo+pen+68+black) or the Sharpie (http://www.sharpie.com/enUS/Pages/fine-point-marker.aspx, you can order them here or look for other stores in your region: http://www.amazon.com/Sharpie-Point-Permanent-Markers-30001/dp/B00006IFHD/ref=sr_1_1?s=office-products&ie=UTF8&qid=1428673509&sr=1-1&keywords=sharpie).

- **Boxes of paper tissues**. These allow participants to clean excess saliva.

- **Alcohol swabs**. These allow participants to clean the pen before use, should they wish to do so.

- **Hair clips or ties.** These can be used to tie the hair of participants with long hair, so you can see their mouth well enough on the video recording.

- **Video camera recording system**. Each lab must use video recording to verify that participants are holding the pen correctly throughout the study. APS and *Perspectives on Psychological Science* will provide funding for such a recording system if a participating lab does not already have such capabilities.

Experimental Procedure

The following step-by-step procedure is also explained in a video available on our Open Science Framework page (https://osf.io/spf95/).

1. Before the experiment, confirm that all required materials are present.

2. Welcome the participant.

3. Give the participant a new pen and inform the participant that he/she can keep the pen after the experiment.

4. If necessary, give the participant a hair tie/clip.

5. Show the participant to his/her cubicle. When additional cubicles are available, multiple participants can be tested simultaneously (see the definition of cubicle in the Materials description).

6. Ask the participant to read the information brochure carefully and then sign both informed consent forms. Instruct the participant to notify the experimenter when any questions arise or when the informed consent forms have been read and signed.

   NOTE: It is important that participants should not feel that that they are being watched as they perform the tasks. To get the experimenter's attention participants should for example leave the cubicle, knock on the cubicle door or press a warning button.

7. Leave the cubicle.

8. When the participant indicates that he/she is ready to continue, return to the cubicle and collect the signed informed consent forms and the information brochure. Explain to the participant that the task instructions will be presented on the computer. Inform the participant that in the task instructions, he/she will be asked to hold the pen with their mouth. If desired, he/she can use the alcohol swabs to clean the pen.

9. Inform the participant that he/she can start the task instructions by pressing the space bar and that he/she can take as long as needed to view the instructions.

10. Confirm that the computer has initiated the instructions and then leave the cubicle.

11. The final slide of the computerized instructions asks the participant to notify the experimenter that he/she is ready to begin the experiment.

12. Upon notification, return to the cubicle and hand out the task booklet. Explain to the participant that he/she will perform a series of tasks. Emphasize that, during task performance, the participant should hold the pen as demonstrated in the earlier instructions. Remind participants to respond by selecting the number on the rating scale.

13. Inform the participant that you will observe their performance of the practice task.

14. Watch as the participant completes the practice task. If the participant performs the task incorrectly, correct him/her and ask him/her to complete the practice task again.

15. Point out once more to the participant that he/she must keep the pen in their mouth, held in the instructed way, throughout each task. Also inform them that they can take the pen out of their mouth and use tissues to remove excess saliva only after completing a task.

16. Remind the participant that you will be video recording their performance of the task in order to verify that they are holding the pen correctly throughout each task.

17. Start the video recording.

18. Leave the cubicle. The participant now proceeds to complete the tasks described in the booklet.

19. At the end of the booklet, written instructions tell the participant to leave the booklet in the cubicle and proceed to the experimenter's desk.

20. Debrief the participant according to the requirements of your university's ethics board approval. When permitted by local ethics boards and subject pool guidelines, all participants should be debriefed after the last participant has been tested. That way, participants cannot disclose the true aim of the study to possible new participants (e.g., their friends or classmates). If ethics approval or subject pool guidelines require that each participants be debriefed immediately after participating, they should be explicitly asked not to share the debriefing information with their fellow students. Labs should indicate whether they used delayed or immediate debriefing. The debriefing form is available in English (https://osf.io/ajnvm/) and in Dutch (https://osf.io/d4icx/).

21. Pay/credit the participant as needed, return the participant's copy of the informed consent form, and thank him/her for participating.

22. Terminate the video recording and save the video file. Make sure to name the file using the following naming convention: SubjectNumber_yymmdd where yy refers to the year, mm refers to the month, and dd refers to the day.

23. Collect the booklet from the cubicle.

24. Prepare the cubicles for the next participant.

Exclusion Criteria

Exclusion criteria based on video recordings

For each cartoon, use the video to judge whether the participant was trying to hold the pen correctly and succeeding at doing so.

- It is okay if the pen slips as they flip pages, but while participants are viewing the cartoons and rating them, they should be holding the pen correctly.
- Critically, judgments should be made without knowing the participants' responses. That is, coding of compliance with the instructions should be blind to the data.
- For each cartoon and each participant, code their response to that cartoon as a 1 if they held the pen correctly while viewing and rating it and a 0 if they did not. Thus, the data for each participant will have a code of 0 (exclude) or 1 (include) for each cartoon, in addition to the participant's funniness ratings for each cartoon.

NOTE: Replace any participant who receives 2 or more "0" scores out of the 4 cartoons. You do not need to replace participants who correctly performed the task on 3 or 4 of the cartoons. Please keep the data from all participants in the data files even if they must be replaced. For those with 2 or more excluded trials, we will just code them for exclusion from the analysis. All data should be retained and reported, though.

Exclusion criteria based on cartoon ratings

Data from individual participants are excluded from analysis if their ratings exceed 2.5 standard deviations from the group mean in their specific condition.

Exclusion criteria based on exit interview

Data from individual participants are excluded from analysis when participants:

- Guess the goal of the study – that the position of the pen influences the funniness ratings for the cartoons.
- Indicate that they did not understand the cartoons, i.e. they answered "No" to the question: "Did you understand the cartoons?"