# The Effects of Social Exclusion to Pain Sensitivity on Different Ages

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**Abstract.** This work introduces the research about the effects of social exclusion to social and physical pain sensitivity on people in different ages. This work takes different level of social exclusion as the independent variable and take the social and physical pain sensitivity as the dependent variable. The work has two age types of people as out participants, kids 5–14year-old kids and 60–69-year-old old people. They will be divided up into simulation to show mild and severe pain sensitivity. The work will use cold ice water test, observe young kids' behaviors, and send out the questionnaires to old people. The T-test analysis is our statistical methods. The expected results are young people have higher pain sensitivity than old people under the same level of severe exclusion, and all participants have higher pain sensitivity under severe social exclusion and have less or no pain sensitivity under mild social exclusion.

**Keywords:** social exclusion · behavior · pain sensitivity · age differences

## 1 Introduction

Social exclusion means individual is rejected, repelled, or belittled by social group or other individuals. Social exclusion has been a prevalent topic among social because it is related with many evident psychological problems and phenomenon in the society. And we feel the pain and get hurt of being excluded [1]. This paper examines the effects of social exclusion to physical and social pain sensitivity on different ages, and we examine whether different levels of social exclusion will affect the severity of pain sensitivity at first. In the past research, researchers have already found that social exclusion causes increased emotional- and physical-pain sensitivity [2]. Social exclusion becomes a common phenomenon in the society. There are many ways to show social exclusion, for instance, rejection, isolation, neglect etc. Consequently, people will have intense psychology reaction. This research examines whether age will affect pain sensitivity that caused by social exclusion.


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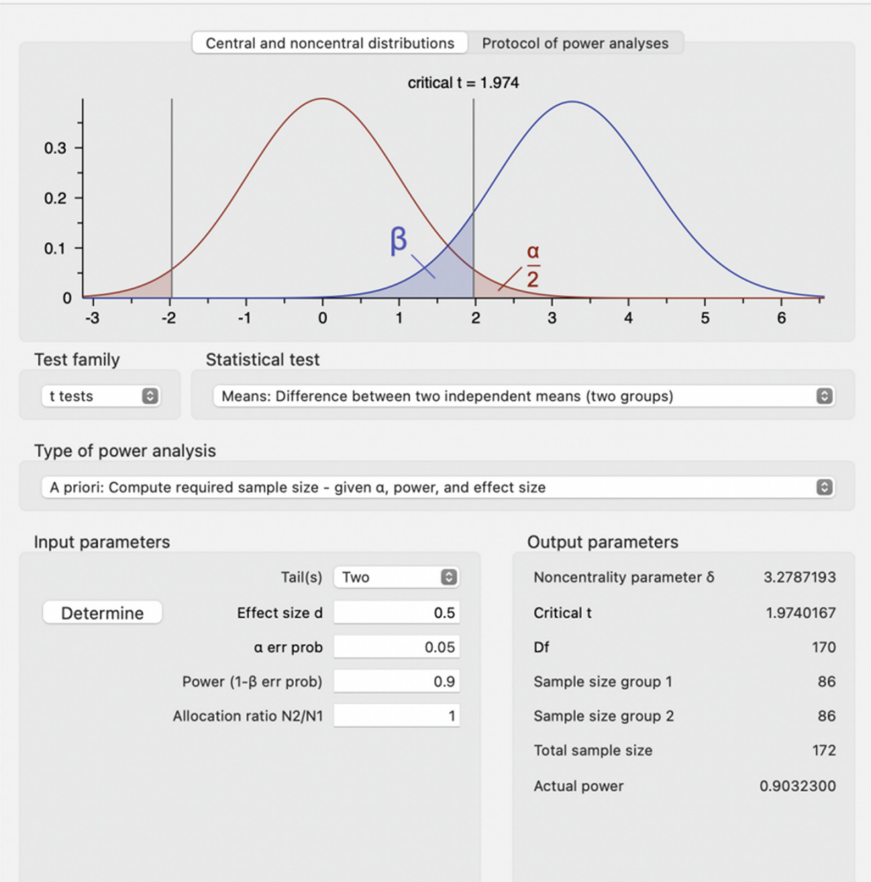


**Fig. 1.** A power analysis using the software package G*Power to the work. Figure 1 shows the power analysis using the software package G*Power (Erdfelder, Faul, & Buchner, 1996) indicates that with $N = 200$, our experiment could detect an effect size of Cohen's $d$ of .302, using a paired $t$-test at a 5% alpha level (two-tailed) threshold with 90% statistical power.

## 2 Experiment 1

### 2.1 Method and Participants

172 individuals will be invited to participate in the research into 2 groups. 43 female kids and 43 male kids from 5 to 14 years old and 43 female old people and 43 male old people from 60 to 69 years old. For young kids, the work will ask their parents' permission to get the consent form and tell them there are not any substantial hurt and danger during the whole experiments. All participants will be asked to sign on the permission paper to get the consent and all participants will receive the feedback and the results of the study.

This is a within-subject experiment, the independent variable of our research is different level of social exclusion and take the social and physical pain sensitivity as the dependent variable. Participants will be firstly asked to take part in a cold ice water test

to get a standard test results T1 and to fill in a form to get the original mental statement and get SCORE 1.

### 2.2 Procedures

Self-report 1 and Ice water test 1.

Simulation 1.

Self-report 2 and Ice water test 2.

Simulation 2.

Self-report 3 and Ice water test 3.

*Results*

***Measure 1***. Every participant will be asked to self-report, filling in a form that indicate the different levels of anxiety to get the participants' original social pain sensitivity. All participants will be asked to put their hands in a water tank that stores the ice water. Because the temperature of the ice water is stable, keeping at 0 degree centigrade. Then researchers use a second chronograph to record the maximum amount of time participants could hold their hands in ice water called the original time for each participant to get the original physical pain sensitivity. More time the participants can endure compared with the standard results, higher physical pain sensitivity the participants have.

*Measure 2*

*Simulation 1*

Both young and the old will be divided up into the same mild exclusion simulation, excluding by individuals. There is total 172 participants in the research. And all participants will be randomly divided into two groups, and one person from each group will be randomly selected as our subject. In the experiment, each group of participants will be placed in a room alone, and the experimenter will hand out a bottle of water to the participant, while the subject will not receive water.

After the simulation, every participant will be asked to take the cold ice water test T2 and fill in the mental statement self-report form and get SCORE 2 again.

*Simulation 2*

In simulation 2, the same group of people will be involved in severe social exclusion experiments. The elderly group and the children group will be separated from the experiment, we will randomly select 85 children from the 86 children, and then randomly select 85 old people from the elderly group. In the children's group, 85 children were randomly divided into five groups of 17. We will randomly select one subject from each group, and the remaining four will receive a lollipop from the researcher. In the elderly group, 85 elderly people will be randomly divided into 5 groups, a total of 17 groups. The loss of reward in the group will make people depressive, jealousy and anxious [3]. We will randomly select one subject from each group, and the remaining four will also receive a lollipop from the researcher. And the subject will get nothing.

After the simulation, every participant will be asked to take the cold ice water T3 and fill in the mental statement self-report form and get SCORE 3 again.

Table 1 shows the experimental objects of this work and how to group them.

**Table 1.** Subjects and groups

| Conditions | High-severity social exclusion | Low-severity social exclusion |
|---|---|---|
| Young people (5–14) | Children high exclusion | Children low exclusion |
| Old people (90–96) | The old high exclusion | The old low exclusion |

**Mental statement self-report:**

| | | | | |
|---|---|---|---|---|
| I'm feeling very anxious right now. | 1 | 2 | 3 | 4 |
| I feel my heart beating fast. | 1 | 2 | 3 | 4 |
| I am troubled by bouts of dizziness. | 1 | 2 | 3 | 4 |
| I have fits of fainting or feeling like I'm going to faint. | 1 | 2 | 3 | 4 |
| I find it hard to breathe in and out. | 1 | 2 | 3 | 4 |
| I have numbness and tingling in my hands and feet . | 1 | 2 | 3 | 4 |
| I am troubled with stomachache or indigestion. | 1 | 2 | 3 | 4 |
| I have to urinate a lot. | 1 | 2 | 3 | 4 |
| I felt very annoying. | 1 | 2 | 3 | 4 |
| My hands are dry and warm. | 1 | 2 | 3 | 4 |

**NAME(code):**

**TOTAL SCORE:**

**Fig. 2.** Mental statement self-report after experiment

## 3 Result

The longer participants held their hands in cold water, the lower their sensitivity became. We expected that, from Simulation1, the tolerance time of all participants to cold water roughly did not change, which meant that their pain sensitivity did not change, $T2-T1 = 0$, and individual rejection would not affect physical pain sensitivity. In Simulation2, most subjects changed their tolerance time of cold-water test, and their tolerance time of cold water became shorter, which meant that $T3 - T1 < 0$. Therefore, individual exclusion from the group will have an impact on physical pain sensitivity. In terms of age, the average time difference of the children group was larger than that of the elderly group. This means that the physical pain sensitivity of children will be more affected after being excluded from the group. Young people have higher pain sensitivity than old people under the same level of severe exclusion, and all participants have higher pain sensitivity under severe social exclusion and have less or no pain sensitivity change under mild social exclusion. In the experiment, some participants may not have obvious changes in pain sensitivity caused by group rejection, or the group rejection may have no effect on their pain sensitivity at all [4]. Also, research shows that, overlap between social and physical pain was an evolutionary development to aid social animals in responding to threats So some people feel less pain over time after repeated exposure to ice water and can hold their hands in ice water for longer periods of time [5]. In the experiment, a time difference greater than -5s was not considered to influence pain sensitivity.

Figure 2 shows the form the participant should fill after each experiment to show the mental statement.

If your SCORE2-SCORE1 is not greater than five after the end of Simulation1, this means that individual rejection has no effect on pain sensitivity. After the end of Simulation2, when the subject was subjected to collective rejection, SCORE3-SCORE1 was greater than five, which proved that collective rejection would have an impact on pain sensitivity. The higher the score was, the higher the pain sensitivity became. If the difference in the scores of the older group was smaller than the difference in the scores of the younger group, the increase in sensitivity to pain caused by group rejection was greater (Table 2).

## 4 Conclusion

In modern social life, social exclusion is not uncommon. There are many influences it brings to us. In our experiment, we wanted to find out the influence of different levels of social rejection on physical and social pain sensitivity, and the influence of changes in physical and social pain sensitivity caused by rejection at different ages. We expected to find that physical and social pain sensitivity would be both higher in children who were rejected than in older adults. In daily life, there are many children may be deliberately or inadvertently ostracized in family life, school life. Such as not receiving fair rewards at home and being isolated from other students at school. And they get more care, care, and respect than the elderly. At the end of the work, the work hope that more parents, teachers and children can see and send the same care and support to every child around. But there are some limitations to the experiment, such as ethical limitations. Having younger and older children and the elderly put their hands in ice water may cause minor frostbite. The results can be slightly skewed when self-reporting.

**Table 2.** Shows all the classification, experimental data and calculations required for all experiments

| Before the experiment 1 | | | Simulation 1 | | | | Simulation2 | | |
|---|---|---|---|---|---|---|---|---|---|
| 172 participants | Ice water test | T1 | 86 groups | T2(Non-subject) | T2(subject) | T2–T1 | Age(old) 17 groups | T3(subject) | T3–T1 |
| Participant 1 | | | Group 1 | | | | Group1 | | |
| Participant 2 | | | Group 2 | | | | Group 2 | | |
| Participant 3 | | | Group 3 | | | | Group 3 | | |
| Participant 4 | | | Group 4 | | | | Group 4 | | |
| … | | | … | | | | … | | |
| Participant 171 | | | Group 86 | | | | Group 17 | | |

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