**Environmental Education: Geographical Proximity on the Willingness to Change Behaviour**

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## Executive Summary

The way in which environmental issues are framed may have an impact on individual willingness to change behaviour. This experiment was conducted to determine how the education on salmon stock declines affect people's willingness to change their consumption behaviour. We hypothesized that individuals exposed to a locally emphasized-education intervention would have increased willingness to change their seafood consumption and be more likely to sign a petition to help stop overfishing, compared to globally emphasized-education (GEE) and no education (NE) conditions. In an online questionnaire, participants were randomly assigned to the conditions and GEE and LEE were asked to read a short infographic specific to that condition. Each participant was asked to answer the same questionnaire regarding their awareness of the environmental issue of overfishing and their willingness to change their seafood consumption behaviour and sign a petition to support efforts to improve the environmental issue. Due to limitations in our study design and implementation, the results did not demonstrate statistically significant results. Nevertheless, our hypothesis is supported by construal theory which outlines how education regarding a local issue has a greater impact on one's willingness to change behaviour than does education regarding a global, or abstract issue[1]. Our findings can be used to develop further research projects to explore the effectiveness of educating in a local vs. global context.

*Keywords:* motivation, education, environment, behaviour, local, global

## Introduction

Fish is rated as having high 'Global Warming Potential' (total Co2 emission), especially tuna and salmon[2]. Additionally, overfishing and salmon farming leads to adverse changes in marine ecosystems [3] . Korkala et al. note that concern about climate change has been linked to climate-friendly food choices, such as a decreased intake of animal products (2014)[4]. BC salmon stocks relate to broader the issues of biodiversity and long-term food security, both of which are pillars of environmental sustainability. For these reasons we focused our study on dietary practices and salmon stocks in British Columbia, Canada. Communicating climate action information is challenging, but a recent study found that local message frames have greater success in educating populations about climate change issues compared to global issue framing[5]. Construal theory suggests that "as distance increases, mental representations become less concrete and more abstract[1]. The psychological distance may hinder climate change engagement—why bother to change one's habits and lifestyles for a cause that is outside one's daily sphere?"[6].

Place attachment suggests that individuals form an emotional and cognitive bond with a particular place, due to memories, cultural or religious values, and comfort and community[4]. Which is a predictor in individuals willingness to act on climate change issues if it is relevant to their geographical local location. This study showed that the local message increased climate change engagement, compared to the control group[7]. Similarly, we conducted a local and global education condition portrayed through infographics to find out if local issue educating will have a more significant impact on participants willingness to change their food consumption behaviour, which we measured through their actual behaviour, to sign a petition. We defined local as anyone currently living in British Columbia, and global the rest of the world. Our motivation for this study was to expand research on the effectiveness of global vs. local education as this may inform UBC's strategy on how to encourage pro-environmental behaviours.

## Methods

We had a total sample of 147 self-selected participants, although we only used the data of 119 participants due to technical errors. 46 participants were in the Control condition, 39 participants in the Local condition, and 34 participants in the Global condition.

Participants of our study were randomly assigned to one of the three education conditions ('Local', 'Global', or 'Control'). The education condition was imbedded into the survey. Each condition contained the same survey, but the education intervention was applied differently. Participants in the global condition saw an infographic that used global examples of the decline of fish in the ocean as well as its impact as education. The Local condition on the other hand, used an infographic that used local BC examples of fish declination such as BC Salmon and its importance. While in the control condition, the education was substituted with a "click next" field.

We created a survey using Qualtrics, which contained yes-no questions, multiple choice, and Likert-type scale questions. We measured two different metrics: measure of motivation (willingness to change seafood consumption behavior) and measure of action (willingness to sign a petition). These two main measures were compiled from several metrics. Motivation to change behavior was measured using a composite score calculated from several survey questions, and

actual change in behavior was measured using the frequency of "Yes" and "No" responses to a question that asked participants if they were willing to sign a petition.

The survey was distributed through various online methods such as Facebook, Messenger, and WhatsApp and data was collected from March 5th, 2019 to March 14th, 2019. The survey itself was made up of four sections as follows: Consent form, Baseline questions, Educational infographic, Intervention questions and lastly, a petition. To measure the participants baseline, participants answered various questions pertaining to their dietary habits, preferences and perception of personal impact on society. Next, depending on the condition, participants would either view a Local or Global Infographic or see a "Click Next" button if they were in the control condition. Following this, participants were given a set of questions that acted as intervention questions, as well as demographic questions. Lastly, participants were given the option to sign a petition to support sustainable seafood. If they support it, they would have to write a brief statement of support in another empty box that was given, which upon completion, marked the end of the survey.

## Results

No statistically significant results were found. In our study, contextualizing education about sustainable seafood consumption as 'local' did not make survey respondents more willing to change their seafood consumption. It also did not make survey respondents more likely to check "Yes" after they were asked to support a petition about increasing sustainable seafood options and reducing overfishing.

One-way ANOVAs were used to analyze our measure of motivation. For background tests, we examined whether baseline "willingness to change seafood consumption" was similar between the 'Local-geographic' and 'Local-cultural' conditions. There was no statistically significant difference between these groups, so we combined them into one 'Local' condition. Another test was done to ensure that baseline "willingness to change seafood consumption" was similar between conditions 'Local', 'Global', and 'Control'. This was true (results of this ANOVA were not statistically significant). Next, we tested the composite scores of "willingness to change seafood consumption" between the 'Local-geographic' and 'Local-cultural' conditions. Since there was no statistically significant difference between these groups, we also combined them into one 'Local' condition. For the test of our measure of motivation, we tested whether composite scores of "willingness to change seafood consumption" was different between conditions 'Local', 'Global', and 'Control'. There was no difference between conditions (results of this ANOVA were not statistically significant). F = 0.586, df = 2, p = 0.558. Mean = Local (10.62), Global (10.26), Control (11), with SD = Local (2.3), Global (3.1), Control (3.3).

Chi-squared tests were used to analyze our measure of action. Six Chi-squared tests were run in total (five background tests, one test of our measure). For background tests, we investigated whether the frequency of "Yes" or "No" responses differed between the "local petition" question and the "global petition" question, within each condition ('Local-geographic', 'Local-cultural', 'Global', and 'Control'). No significant differences were found between the "local petition" and the "global petition" within any of the conditions. Therefore, we combined the "local petition" and "global petition" responses into one category of "petition". We also tested to compare the frequency of "Yes" or "No" responses for the "petition" category, between the different conditions 'Local-geographic' and 'Local-cultural'. No significant difference was found between

these conditions. Therefore, we combined the 'Local-geographic' and the 'Local-cultural' into the condition 'Local'. For the test of our measure of action, we compared the frequency of "Yes" or "No" responses for the "petition" category, between the different conditions 'Local', 'Global', and 'Control'. No significant difference was found between these conditions. Mean (across all conditions): 33.33 % = Yes (willing to sign a petition), with SD = 5.68. The chi-square statistic is 1.5586. The p-value is .45872. The result is not significant at $p < .05$.

## Discussion

The purpose of this study was to determine whether the geographic proximity of an environmental issue would have an impact on the willingness to change personal behaviour that directly contributes to that issue. Our results statistically indicate that there is no difference between cultural or geographic contexts when information is presented on a local or global scale. No statistically significant results were obtained, although it is highly likely that any possible relationship was obscured by flaws and limitations in our experimental design, which we will discuss at length. Since previous literature supports our hypothesis, more research should be conducted to characterize any potential relationship between local or global emphasized environmental education on willingness to change behavior and actual change in behavior at the University of British Columbia (UBC) Vancouver campus.

This study looks at the impact of education on seafood consumption on motivation to change behavior and actual behavior change. The topic of education we chose was seafood consumption, which we chose over topics such as plastic waste and meat consumption because these alternatives are more likely to lead to confounds. By choosing to study seafood consumption, we rule out confounds such as participants not eating meat because of an emotional connection to animals, and it is also much easier to provide examples of 'local' vs. 'global' impact than, e.g. trying to find a local vs. global equivalent of reducing plastic bags. By asking participants if they were willing to sign a petition, we measured the actual effect of our education intervention on behavioral; which is relevant because knowledge, intentions, beliefs, and attitudes alone do not fully predict behavior [7]. Research in this field is lacking but critical considering the near-future impacts of climate change and environmental degradation, thus, further research applicable to the UBC community is recommended.

This study has many limitations that need to be addressed in future studies. Most of our limitations occurred in the survey design, which significantly affected the depth of data we were able to collect, the analyses, and the overall quality and power of the investigation. Firstly, our survey sample size and demographics were limited. Originally, we planned to include demographic questions (such as age, sex, gender, and income) in order to disaggregate our data and make any findings applicable to subpopulations at UBC. However, we elected to remove most of these questions in the interest of survey length, to maintain survey response rates. Secondly, our sample size was limited to those with an online presence in our social media networks, as we were not able to do physical data collection (potentially missing students not typically engaged online, non-UBC community members, and older adults including faculty and staff at UBC). Our period of collection was relatively short, and our sample size was small. Due to errors with survey flow and randomization of questions, sample size was further reduced for several questions. Additionally, survey responses might be a poor representation of participant's true feelings of motivation and willingness to act, considering there were no incentives for the

survey, and there was no way to ensure participants fully read the questions or learned from our educational intervention. Our survey had multiple concerns with flow and logic, which caused problems for participants. Those practicing a plant-based diet could not opt out of the survey once they began and needed to be excluded from our sample size before analysis. Another challenge and source of potential error is that participants needed to be manually sorted into conditions, and several questions reverse-coded (due to the infographic question not being properly formatted, and the several questions having flipped likert scales). Value-laden wording of the questionnaire may have unintentionally biased the survey. Additionally, we were unable to determine the length of time respondents spent reading the educational infographics, thus, we cannot be certain participants actually received education. In the future, researchers should inform participants that they will be tested about the infographic after reading, or otherwise include tactics to ensure engagement. We also experienced difficulty with our questionnaire design. In the effort to try and counterbalance our measures of motivation, slightly different questions were asked before and after the educational intervention, resulting in no way to compare participants' "willingness the change behavior" before and after the education. To best utilize this data, we did a comparison of 'baseline' levels of motivation before the education, between all conditions. Finally, our measure of action was not could have been made more effective. Originally, we planned for each survey participant to answer whether they were willing to sign petitions about both local and global overfishing issues and seafood sustainability. However, due to survey design problems, respondents were randomly assigned between the two for each condition. In order to get a valuable sample size, we combined these two measures into one measure, and used "signed a petition" as our only measure of action. Due to the various complications described above, multiple within- and between-group analyses were done with baseline and measure of motivation data, for multiple subgroups (sub-conditions), before analyses could be done on our actual measures of motivation and action. Thus, human error, small sample size, and aggregated measures may contribute to the statistical insignificance of our results.

Other limitations could have arisen due our education topic. We chose to educate our study participants on overfishing and seafood consumption to ensure that participants felt they could have some level of autonomy and power over their daily consumption choices, and thus have minimal barriers to potential behavior change. We attempted to develop a GEE that used abstract concepts about overfishing rather than one that was geographically different from BC (such as Indian Ocean fish stocks). We believe that this limited the instances of respondents in the 'Global' condition who might associate the GEE with their own "local" context. However, the level of cultural importance and value placed in global fish species and BC salmon stocks may differ between participants (for example, an Indigenous participant may place greater value in BC salmon stocks than a Caucasian participant). Cultural background of the participant should also be considered in future studies in order to avoid conflicting results that arise not due to the limitations of the educational intervention itself, but due to the participant's socialization and cultural identity that may be strongly tied to their meat and seafood consumption. Although these factors may be negligible, we realize that BC is a province with a diverse range of peoples and cultures, and UBC is an incredibly diverse community in and of itself, both of which makes accounting for cultural identity and geographical proximity complicated. It would be beneficial for future studies to emphasize this disparity and to test different operationalizations of local versus global in different cultural contexts.

## Recommendations for UBC Client

Future studies may look at the effectiveness of infographics as a means of sustainability education as compared to other formats such as videos or in-person educators. In designing future studies, researchers may include better fleshed-out operational definitions of 'local' and 'global' to increase internal validity, especially since the UBC population is incredibly culturally and geographically diverse. This could mean using specific infographics that are specially targeted to different UBC sub-populations or limiting the study to individuals who feel a strong sense of identity as a "UBC local" and feel connected to an on-campus sustainability issue.

Using neutral wording in future research is essential to obtain unbiased responses. We also recommend using different research methods, including experimental research and in-person interviews in various on-campus locations including residence dining halls, the AMS nest food-courts, the bus loop, and other cafes and coffee shops. Since knowledge doesn't always predict behavior, we recommend that future research look further into the impacts of nudges in conjunction with or instead of education, on behavioral change. This could be reminders and indicators of social norms regarding reduced meat consumption and sustainable seafood consumption, using text messages, posters, or social media posts in strategic locations. As demonstrated by GlowCap (7), reminders play a critical role in behavior. UBC can work towards making climate actions initiatives on campus more visible. This can include additional funding for advertisements or designating volunteers or staff at food-service locations to remind students to support sustainably sourced (sea)food and reduce their meat consumption. Even more boldly, UBC could reduce the amount of meat and seafood options available on campus or increase its price while subsidizing vegetarian options. Lastly, future research should investigate barriers that preventing people from decreasing their seafood consumption and eating more sustainably-sourced foods even when individuals are aware of the environmental impacts. If student's strained budgets are a key factor, UBC could work toward lowering the prices of sustainably-sourced food on campus or better support student groups working towards this, such as Sprouts.

## References

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## APPENDIX

### Part A: Questionnaire & Survey

#### Detailed measurements

A questionnaire was created to measure participants' willingness to change their seafood consumption, and willingness to sign a petition. A rapid literature review was done to develop a questionnaire that utilized measures of motivation and measures of action, relating to education topics. The structure and wording of the questionnaire was developed with inspiration from the International Positive and Negative Affect Schedule Short Form (I-PNAS-SF), the Sport Motivation Scale (SMS), the Measures of Student Motivation Towards Science Learning (SMTSL), the Academic Motivation Scale (AMS), and a food choice questionnaire from a study on sustainable consumer choices. I-PANAS-SF was used to get a sense of what positive feelings we could screen for, which might be linked to increased feelings of motivation. SMS, SMTSL, AMS, and the food choice questionnaire were used as frameworks to select key measures of motivation, and make them applicable to our environmental education intervention. (Resources and references in Appendix Part 1&2). We created two infographics using Piktochart, one for the local condition and one for the global condition. Both infographics were designed specifically with lecture content from PSYC321, including: We created a survey using Qualtrics, which contained yes-no questions, multiple choice, and Likert-type scale. We had two main measurements: motivation to change behavior, specifically, "willingness to change seafood consumption", and actual change in behavior, specifically, "willingness to sign a petition". These two main measures were compiled from several metrics, outlined below.

To measure the perceived importance of sustainable seafood consumption and perceived competence, motivation, and future intentions to sustainably consume seafood, we used the following questions which were presented before and after displaying the infographic (For Global and Local) or the "Click Next" field (Control): "How important of a factor is money when it comes to making food choices (1 = *Extremely important, 2 = Very important, 3 = Moderately important, 4 = Slightly important, 5 = Not at all important*)", and "It is important for me to be more sustainable and eat sustainably-sourced fish/seafood? (1 = *Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, 5 = Strongly disagree*)", and "I feel there are too many barriers to lowering my intake of fish/seafood (1 = *Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, 5 = Strongly disagree*)", and "It doesn't really make a difference if I choose to eat sustainably-sourced fish/seafood (1 = *Strongly agree, 2 = Somewhat agree, 3 = Neither agree nor disagree, 4 = Somewhat disagree, 5 = Strongly disagree*)".

To measure motivation for behaviour change, including perceived importance of seafood consumption/sustainability, perceived competence, and effort and future intentions to consume sustainable seafood, we used the following questions which were presented before and after the displaying of the infographic (For Global and Local) or the "Click Next" field (control):

"How much do you consider the price when you buy seafood? (1 = *A great deal*, 2 = *A lot*, 3 = *A moderate amount*, 4 = *A little*, 5 = *None at all*)", and "How much do you consider source (where it is from) when you buy seafood? (1 = *Always*, 2 = *Most of the time*, 3 = *About half the time*, 4 = *Sometimes*, 5 = *Never*)", and "To to what extent do you agree with the following statement? "I feel inspired to lower my intake of fish/seafood" (1 = *Strongly agree*, 2 = *Somewhat agree*, 3 = *Neither agree nor disagree*, 4 = *Somewhat disagree*, 5 = *Strongly disagree*)", and "In the future, how many days per week do you intend to consume seafood? (1 = *Never*, 2 = *1 day*, 3 = *2 days*, 4 = *3-4 days*, 5 = *5 or more days*)".

   To measure behaviour change, we used the following questions and statements which were presented after the displaying of the infographic (For Global and Local) or the "Click Next" field (control): "Are you willing to support legislation that cracks-down on illegal fishing of endangered species and penalizes companies and businesses selling unsustainably-sourced fish/seafood? (*Yes*, or *No)*", "Would you be willing to sign a petition that supports the movements in BC to legally adapt and mandate sustainable seafood options (effective in 2025)? (*Yes, I will join my community :), or No, not right now :()*" (local condition), "Would you be willing to sign a petition that supports the global movement to legally adapt and mandate sustainable seafood options (effective in 2025)? (*Yes, I will join my community :), or No, not right now :()*" (global condition) and "Please write a brief statement to express your support".

## Questionnaire

What dietary habit describes you best?
- Omnivore (I eat meat and vegetables)
- Pescatarian (I eat fish/seafood and vegetables)
- Vegetarian (I eat vegetables and some animal products but no meat or seafood)
- Vegan (I eat only vegetables)
- None of the above (write in the box/explain)

How important of a factor is money when it comes to making food choices?
Extremely important    Very important    Moderately important    Slightly important    Not at all important

On average, how much money do you spend on food a day?
5$ or less    5$-15    $15$-25$    25$-40$    $40+

On average, how many days per week do you consume seafood?
Never    1 day    2 days    3-4 days    5 or more days

How much do you consider the price when you buy seafood?
A great deal    A lot    A moderate amount    A little    None at all

How much do you consider source (where it is from) when you buy seafood?
Always    Most of the time    About half the time    Sometimes    Never

I feel knowledgeable about overfishing and its impacts on sustainability

Strongly agree    Somewhat agree        Neither agree nor disagree    Somewhat disagree    Strongly disagree

In general, I feel that my individual actions impact society
Strongly agree    Somewhat agree        Neither agree nor disagree    Somewhat disagree    Strongly disagree

Please take a moment to read through the short infographic below:
(Global)
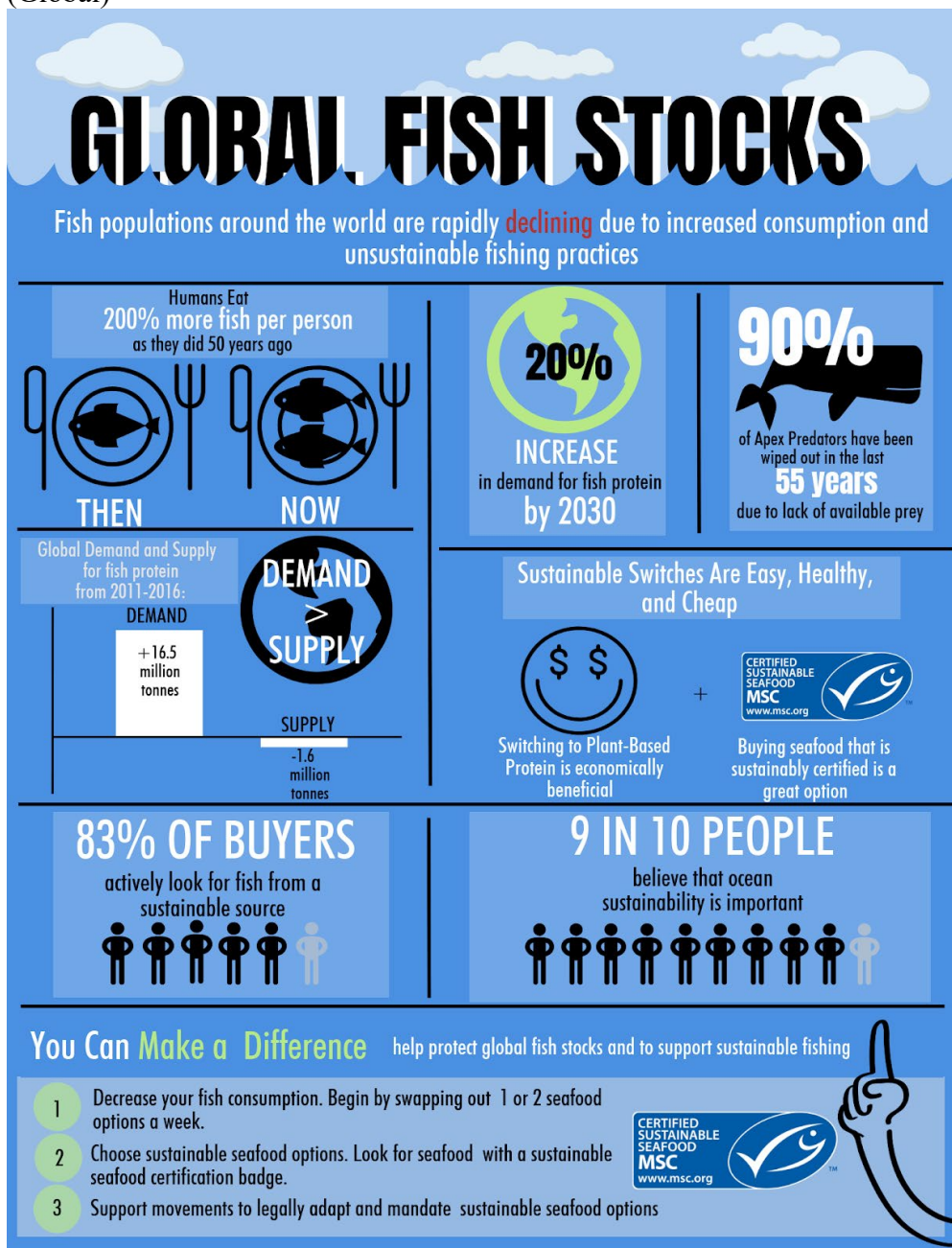


OR

(LOCAL)



# BC SALMON STOCKS

Salmon populations in British Columbia are declining due to increased consumption, unsustainable fishing practices, and habitat destruction

Since the early 1990's
BC Salmon Stocks have
DECLINED
by up to
**90%**
1990's          TODAY

WILD SALMON
**reproduction**
appears to have
DECLINED
by up to
**45%**
from 1954 to 2014

Practicing sustainable seafood consumption ensures that BC Salmon will still be around for
**FUTURE GENERATIONS**

- Economic Stability
- Food Security
- Biodiversity
- Cultural Importance

**83% OF BUYERS**
actively look for fish from a sustainable source

**9 IN 10 PEOPLE**
believe that ocean sustainability is important

**Sustainable Switches Are Easy, Healthy, and Cheap**

$ $          +          ocean wise
A SUSTAINABLE CHOICE

Switching to Plant-Based Protein is economically beneficial

Buying seafood that is sustainably certified is a great option

**You Can Make a Difference**  help protect BC Salmon stocks and to support sustainable fishing

1  Decrease your fish consumption. Begin by swapping out 1 or 2 seafood options a week.

2  Choose sustainable seafood options. Look for seafood with the sustainable seafood certification badge.

3  Support movements to legally adapt and mandate sustainable seafood options

ocean wise
A SUSTAINABLE CHOICE

OR

(CONTROL)

Please click on "Next"


To what extent do you agree with the following statement?
"I feel inspired to lower my intake of fish/seafood".

Strongly agree     Somewhat agree     Neither agree nor disagree        Somewhat disagree     Strongly disagree


In the future, how many days per week do you intend to consume seafood?
Never              1 day                  2 days                   3-4 days           5 or more days

It is important for me to be more sustainable and eat sustainably-sourced fish/seafood.
Strongly agree     Somewhat agree     Neither agree nor disagree        Somewhat disagree     Strongly disagree

I feel there are too many barriers to lowering my intake of fish/seafood.

Strongly agree     Somewhat agree     Neither agree nor disagree        Somewhat disagree     Strongly disagree


It doesn't really make a difference if I chose to eat sustainably-sourced fish/seafood.

Strongly agree     Somewhat agree     Neither agree nor disagree        Somewhat disagree     Strongly disagree

Are you willing to support legislation that cracks-down on illegal fishing of endangered species and penalizes companies and businesses selling unsustainably-sourced fish/seafood?
- Yes
- No

Do you live in British Columbia?

- Yes
- No

Do you identify as a British Columbian?

- Yes
- No

Would you be willing to sign a petition that supports the movements in BC to legally adapt and mandate sustainable seafood options (effective in 2025)?
Yes, I will join my community :)        No, not right now :(
Please write a brief statement to express your support.

Would you be willing to sign a petition that supports the global movement to legally adapt and mandate sustainable seafood options (effective in 2025)?

Yes, I will join my global society :)      No, not right now :(

Please write a brief statement to express your support.

## Background research for questionnaire design development

I-PANAS-SF

http://faculty.chicagobooth.edu/ayelet.fishbach/research/SPCOTilleryFishbach.pdf

**TABLE 2**
**International Positive and Negative Affect Schedule Short Form
(I-PANAS-SF) Exploratory Factor Analyses Loadings and Reliabilities for
Developmental and Validation Samples**

|  | Positive Affect | | | | Negative Affect | | | |
|---|---|---|---|---|---|---|---|---|
|  | Developmental Sample | Validation Sample 1 | Validation Sample 2 | Validation Sample 3 | Development Sample | Validation Sample 1 | Validation Sample 2 | Validation Sample 3 |
| Determined | .83 | .70 | .76 | .75 | −.14 | −.18 | −.03 | −.12 |
| Attentive | .79 | .71 | .75 | .70 | −.1 | −.19 | −.08 | −.13 |
| Alert | .71 | .66 | .75 | .59 | .02 | .17 | .08 | .02 |
| Inspired | .65 | .65 | .61 | .67 | −.05 | −.14 | −.24 | −.05 |
| Active | .61 | .66 | .66 | .68 | −.33 | −.24 | −.24 | −.24 |
| Afraid | −.07 | −.15 | −.10 | −.08 | .81 | .77 | .81 | .76 |
| Nervous | −.10 | −.11 | −.03 | −.02 | .74 | .74 | .76 | .75 |
| Upset | .02 | −.05 | −.05 | −.06 | .72 | .68 | .69 | .71 |
| Ashamed | −.21 | −.19 | −.16 | −.13 | .63 | .66 | .68 | .67 |
| Hostile | −.11 | −.08 | −.09 | −.15 | .63 | .63 | .59 | .55 |
| Cronbach's α | .78 | .78 | .76 | .73 | .76 | .76 | .76 | .72 |

NOTE: Developmental sample 1 $n = 163$; validation sample 1 $n = 444$; validation sample 2 $n = 383$; validation sample 3 $n = 962$. Principal component analyses with varimax rotation. Items are in order of factor loadings for the developmental sample. Item loadings above .30 are in bold.

- Google Scholar "measure(s) OR quantify* AND motivation", "measure* OR quantify* AND motivation", "measure* OR quantify* AND motivation AND advocacy", "measure* OR quantify* AND motivation AND sustainability"

Toward a New Measure of Intrinsic Motivation, Extrinsic Motivation, and Amotivation in Sports: The Sport Motivation Scale (SMS)

Intrinsic Motivation Toward Accomplishments

This second type of IM has been studied in developmental psychology, as well as in educational research, under such terms as mastery motivation, efficacy motivation, and task-orientation. In addition, other authors have postulated that individuals interact with the environment in order to feel competent and to create unique accomplishments (Deci, 1975; Deci & Ryan, 1985, 1991). Thus, IM toward accomplishments can be defined as engaging in an activity for the pleasure and satisfaction experienced when one attempts to accomplish or create something. Trying to master certain difficult training techniques in order to experience personal satisfaction represents an example of intrinsic motivation to accomplish things in the sport domain.

Sport Motivation Scale (SMS)
Subjects completed the SMS, along with several scales measuring related constructs in small groups at the beginning of a workout.

Scales used to assess motivational antecedents included:
- **Perceived competence**2 (based on Vallerand, Blais, Brikre, & Pelletier, 1989; e.g., "I consider myself to be a good athlete"; five items, alpha = .59) and four subscales assessing the coach's interpersonal style (CIS). The CIS subscales were: the Autonomy Supportive Climate (e.g., "My coach accepts that mistakes I make are part of a learning process"; four items, alpha = .76), Caring (e.g., "My coach cares about me"; four items, alpha = .79), Providing Structure (e.g., "When my coach asks me to do something, he or she gives me a rationale for doing it"; four items, alpha = .75), and Competence Feedback (e.g., "The feedback I receive from my coach is constructive in helping me make improve- ments"; four items, alpha = .SO).
- Scales measuring various constructs thought to represent sport outcomes were:
- **Distraction in Training** (adapted from Sarason, Sarason, Keefe, Hayes, & Shearin, 1986; three items, alpha = .43),
- **Effort** (adapted from Ryan & Connell, 1989; three items, alpha = .51), and
- **Future Intention to Practice Their Sport** (adapted from Pelletier et al., 1988; four items, alpha = .60).

All of the above scales were assessed on a 7-point scale anchored by the end points does not correspond at all (I) and corresponds exactly (7) with the midpoint corresponds moderately (4). Subjects were informed that we were interested in better understanding the reasons why they practiced their sport. They were told they did not have to complete the questionnaire but that their collaboration would be very much appreciated. Finally, athletes were told not to put their names on the questionnaire, that data from the study would only serve scientific purposes and would therefore remain strictly confidential.
- The development of a questionnaire to measure students' motivation towards science learning

Measures students' motivation toward science learning (SMTSL).
Six scales were developed: self-efficacy, active learning strategies, science learning value, performance goal, achievement goal, and learning environment stimulation

A review of learning motivation studies revealed the diversity and variety of motivation factors, such as self-perceptions of ability, effort, intrinsic goal orientation, task value, self-efficacy, test anxiety, self-regulated learning, task orientation and learning strategies (Garcia 1995 Garcia, T. (1995). The role of motivational strategies in self-regulated learning. *New Directions for Teaching and Learning*, 63: 29–42. , Garcia and Pintrich 1995 Garcia T Pintrich PR (1995) The role of possible selves in adolescents' perceived competence and self-regulation Paper presented at the annual meeting of the American Educational Research Association, San Francisco CA April , Nolen and Haladyna 1989 Nolen SB Haladyna TM (1989) Psyching out the science teacher: Students' motivation, perceived teacher goals and

study strategies Paper presented at the annual meeting of the American Educational Research Association, San Francisco CA March , Pintrich and Blumenfeld 1985 Pintrich, PR and Blumenfeld, PC. (1985). Classroom experience and children's self-perceptions of ability, effort, and conduct. *Journal of Educational Psychology*, 77(6): 646–657. ). These studies, on the one hand, highlighted the diversity of the learning motivation and, on the other hand, showed how researchers' interests influenced the approach taken to aspects of motivation.

Although there are many motivation questionnaires used in the aforementioned educational psychology studies (Midgley et al. 1993 Midgley C Maehr ML Urdan TC (1993) *Patterns of adaptive learning survey* Ann Arbor MI *University of Michigan Press* ; Pintrich et al. 1991 Pintrich PR Smith DAF Garcia T McKeachie WJ (1991) *A Manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)* Report Number NCRIPTAL-91-B-004. Ann Arbor MI *National Center for Research to Improve Postsecondary Teaching and Learning* (ERIC Document Reproduction Service No. ED 338 122). ; Uguroglu et al. 1981 Uguroglu, ME, Schiller, DP and Walberg, HJ. (1981). A multidimensional motivational instrument. *Psychology in the Schools*, 18: 279–285. ), these questionnaires were mainly developed by psychologists who were interested in pre-determined motivation domains in understanding students' general learning motivation rather than addressing, specifically, motivation for learning science. For instance, the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al. 1991 Pintrich PR Smith DAF Garcia T McKeachie WJ (1991) *A Manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ)* Report Number NCRIPTAL-91-B-004. Ann Arbor MI *National Center for Research to Improve Postsecondary Teaching and Learning* (ERIC Document Reproduction Service No. ED 338 122). ) was designed to assess college students' motivational orientations and learning strategies, and the Multidimensional Motivation Instrument (Uguroglu et al. 1981 Uguroglu, ME, Schiller, DP and Walberg, HJ. (1981). A multidimensional motivational instrument. *Psychology in the Schools*, 18: 279–285. ) examined the relation between the learning environment and students' motivation, affect and behaviour. Researchers (Blumenfeld 1992 Blumenfeld, PC. (1992). Classroom learning and motivation. Clarity and expanding goal theory. *Journal of Educational Psychology*, 84: 272–281. , Blumenfeld and Meece 1988 Blumenfeld, PC and Meece, JL. (1988). Task factors, teacher behaviour, and students' involvement and use of learning strategies in science. *The Elementary School Journal*, 88: 235–250. , Lee and Anderson 1993 Lee, O and Anderson, CW. (1993). Task engagement and conceptual change in middle school science classrooms. *American Educational Research Journal*, 30(3): 585–610. , Lee and Brophy 1996 Lee, O and Brophy, J. (1996). Motivational patterns observed in sixth-grade science classrooms. *Journal of Research in Science Teaching*, 33(3): 585–610. , Weiner 1990 Weiner, B. (1990). History of motivational research in education. *Journal of Educational Psychology*, 82(4): 616–622. ) have stressed the importance of investigating students' motivation when studying specific subject content areas because they may express different motivational traits in these areas. Hence, it is important to develop a questionnaire to investigate students' learning motivation in science.

We used six factors of motivation into designing our scales in the new questionnaire. In the following, we define each factor in the questionnaire.

1.

*Self-efficacy*. Students believe in their own ability to perform well in science learning tasks.
2.
*Active learning strategies*. Students take an active role in using a variety of strategies to construct new knowledge based on their previous understanding.
3.
*Science learning value*. The value of science learning is to let students acquire problem-solving competency, experience the inquiry activity, stimulate their own thinking, and find the relevance of science with daily life. If they can perceive these important values, they will be motivated to learn science.
4.
*Performance goal*. The student's goals in science learning are to compete with other students and get attention from the teacher.
5.
*Achievement goal*. Students feel satisfaction as they increase their competence and achievement during science learning.
6.
*Learning environment stimulation*. In the class, learning environment surrounding students, such as curriculum, teachers' teaching, and pupil interaction influenced students' motivation in science learning.
The items were constituted using five-point Likert-type scales. Items on the scales are anchored at 1 = strongly disagree, 2 = disagree, 3 = no opinion, 4 = agree and 5 = strongly agree.

(full questionnaire available in the appendix)
https://www-tandfonline-com.ezproxy.library.ubc.ca/doi/full/10.1080/0950069042000323737?scroll=top&needAccess=true#app1


The Academic Motivation Scale: A Measure of Intrinsic, Extrinsic, and Amotivation in Education

IM → intrinsic motivation: for the pleasure of doing something for itself
EM → extrinsic motivation: means to an end, not for its own sake

Students filled out the AMS, and then results were analyzed through confirmatory factor analysis with LISREL
- A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.

A meta-analysis of 128 studies examined the effects of extrinsic rewards on intrinsic motivation. As predicted, engagement-contingent, completion-contingent, and performance-contingent rewards significantly undermined free-choice intrinsic motivation ($d$ = –0.40, –0.36, and –0.28, respectively), as did all rewards, all tangible rewards, and all expected rewards. Engagement-contingent and completion-contingent rewards also significantly undermined self-reported interest ($d$ = –0.15, and –0.17), as did all tangible rewards and all expected rewards. Positive feedback enhanced both free-choice behavior ($d$ = 0.33) and self-reported interest ($d$ = 0.31). Tangible rewards tended to be more detrimental for children than college

students, and verbal rewards tended to be less enhancing for children than college students. The authors review 4 previous meta-analyses of this literature and detail how this study's methods, analyses, and results differed from the previous ones. (PsycINFO Database Record (c) 2016 APA, all rights reserved)

Concluding Comments

Careful consideration of reward effects reported in 128 experiments leads to the conclusion that tangible rewards tend to have a substantially negative effect on intrinsic motivation, with the limiting conditions we have specified. Even when tangible rewards are offered as indicators of good performance, they typically decrease intrinsic motivation for interesting activities.

Although rewards can control people's behavior—indeed, that is presumably why they are so widely advocated—the primary negative effect of rewards is that they tend to forestall self-regulation. In other words, reward contingencies undermine people's taking responsibility for motivating or regulating themselves. When institutions—families, schools, businesses, and athletic teams, for example—focus on the short term and opt for controlling people's behavior, they may be having a substantially negative long-term effect. Furthermore, as noted by Kohn (1993), when organizations opt for the use of rewards to control behavior, the rewards are likely to be accompanied by greater surveillance, evaluation, and competition, all of which have also been found to undermine intrinsic motivation (Deci & Ryan, 1985).

Research has shown the value of being intrinsically motivated in many applied settings such as education, sports, and work environments. In addition, research on intrinsic motivation has focused attention on the more general benefits of supports for autonomy and competence for motivated persistence, performance, and well-being. Many social institutions face problems including alienation, detachment, and disengagement that could be at least partially ameliorated by promoting higher levels of intrinsic motivation and self-determination. Strategies focused on optimizing the psychological need satisfactions associated with active engagement of various tasks within specific performance settings thus offer important alternatives to the use of rewards and other social controls to motivate behavior. As research has shown, there are conditions under which tangible rewards do not necessarily undermine intrinsic motivation, but the evidence indicates clearly that strategies that focus primarily on the use of extrinsic rewards do, indeed, run a serious risk of diminishing rather than promoting intrinsic motivation.

Assessing students' motivation to engage in sustainable engineering

A new measure of motivation toward education has been developed in French, namely the Echelle de Motivation en Education (EME). The EME is based on the tenets of self-determination theory and is composed of 28 items subdivided into seven sub-scales assessing three types of intrinsic motivation (intrinsic motivation to know, to accomplish things, and to experience stimulation), three types of extrinsic motivation (external, introjected, and identified regulation), and a motivation. The purpose of this investigation was to cross-culturally validate in English the EME. The EME was translated in English through appropriate methodological procedures and completed by university students. Results

revealed that the English version of the scale renamed the Academic Motivation Scale (AMS), has satisfactory levels of internal consistency (mean alpha value = .81) and temporal stability over a one-month period (mean test-retest correlation = .79). In addition, results of a confirmatory factor analysis (LISREL) confirmed the seven-factor structure of the AMS. Finally, gender differences obtained with the EME were basically replicated with the AMS. In sum, the present findings provide adequate support for the factorial validity and reliability of the AMS and support its use in educational research on motivation.

- Cognitive and motivational structure of sustainability

Sustainable behaviour implies acting on behalf of long term collective beneficial outcomes. Acting sustainably therefore is a moral rather than a rational decision. One of the most coherent and empirically supported models of sustainable, or moral motivations, is the extended norm activation model (Stern et al., 1993, Turaga et al., 2010). Norms evolve in social lives, when individual actions cause negative side-effects to others (Biel and Thøgersen, 2007, Coleman, 1990). Norms therefore are social in origin, and restrict individual egoist impulses in favour of collective outcomes. Violation of norms is met by sanctions, that can be imposed by others or can be self-imposed. Personal norms are internalised norms with self-imposed sanctions. Given the lack of social sanctions sustainable consumer behaviour is assumed to be dependent on personal norms. The activation of personal norms is modelled in the extended norm activation model (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). In the extended norm activation model altruistic, biospheric and egoistic values and adherence to the New Environmental Paradigm perspective (Dunlap, Van Liere, Mertig, & Jones, 2000) are the main precursors to the activation of personal norms that guide sustainable behaviour.

Based on the theoretical overlap between norm-activation models and social dilemma models, the extended norm activation model has been expanded further. Incorporating Concern for Future Consequences and Social Value Orientation into the model adds to the prediction of a range of sustainable behaviours (Joireman, Lasane, Bennett, Richards, & Solaimani, 2001). Expanding norm activation with Social Value Orientation and Concern for Future Consequences link the extended norm activation model to the social and the temporal dimensions that are implicit in the WECD definition of sustainability.

WCED and Triple P dimensions were rated for 10 product attributes. These attributes were selected to represent sustainable aspects of food products that cover all WCED and Triple P dimensions, as well as some utilitarian attributes. Three utilitarian attributes were included (taste, low price and convenience) and six sustainability-related attributes (environment friendly, animal friendly, locally produced, fair trade, natural, and waste prevention. Healthiness was added as in important attribute, with long term personal benefits. The attributes were selected after discussion with 14 major stakeholders from the food chain in order to cover a wide range of aspects that are related to sustainability. Stakeholders represented agricultural production, processing industry and retail, as well as (semi-)government organisations. The attributes that were agreed upon by the stakeholders cover the ethical motives and major utilitarian dimensions of the Food Choice Questionnaire (Lindeman and Väänänen, 2000, Steptoe et al., 1995), which supports their use in this study.

Cognitive structure was measured by asking respondents to rate the attributes on different dimensions. Social and temporal dimensions of attributes were measured by sequentially

scoring two items on seven point scales. The top scale contained end poles that denote social distance of consequences, ranging from "myself" to "other people". The bottom scale contained end poles that denote temporal distance of consequences, ranging from "immediate" to "the long term". Examples of the scales, with the measured attribute in square brackets, are reproduced in Fig. 1. A statement denoting the attribute and both items measuring the social and temporal distance were projected on screen. After ticking a score in each scale the respondents could proceed to the next screen with a statement denoting the next attribute. The two items were repeated for each of the 10 product attributes included in this survey. The attributes appeared in random order.

| If I only buy food products that [have low price] this will have | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Mainly positive consequences to myself | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Mainly positive consequences to other people |
| Immediate positive consequences | 1 | 2 | 3 | 4 | 5 | 6 | 7 | positive consequences at a long term |

- Water sustainability: environmental attitude, drought attitude and motivation

One impact of climate change being felt by households is the increasing unpredictability of the availability and quality of water supplies. Given the critical circumstance and timely needs created by droughts, this research aimed to explore the relationships among US consumers' perceptions of drought severity, perceived importance of water conservation drivers, participation in water/energy conscious consumption and perceived consumer effectiveness (PCE) in general environmental issues as well as specifically in drought. A survey of 273 consumers in the US state of Texas was conducted during the most severe single-year drought in the region's history. Exploratory factor analysis, confirmatory factor analysis and structural equation modelling were used for data analysis. The results of this study support the importance of PCE in sustainable consumer behaviour and suggest that PCE for a specific issue has a more direct impact on relevant consumer behaviour than PCE for a generalized issue.

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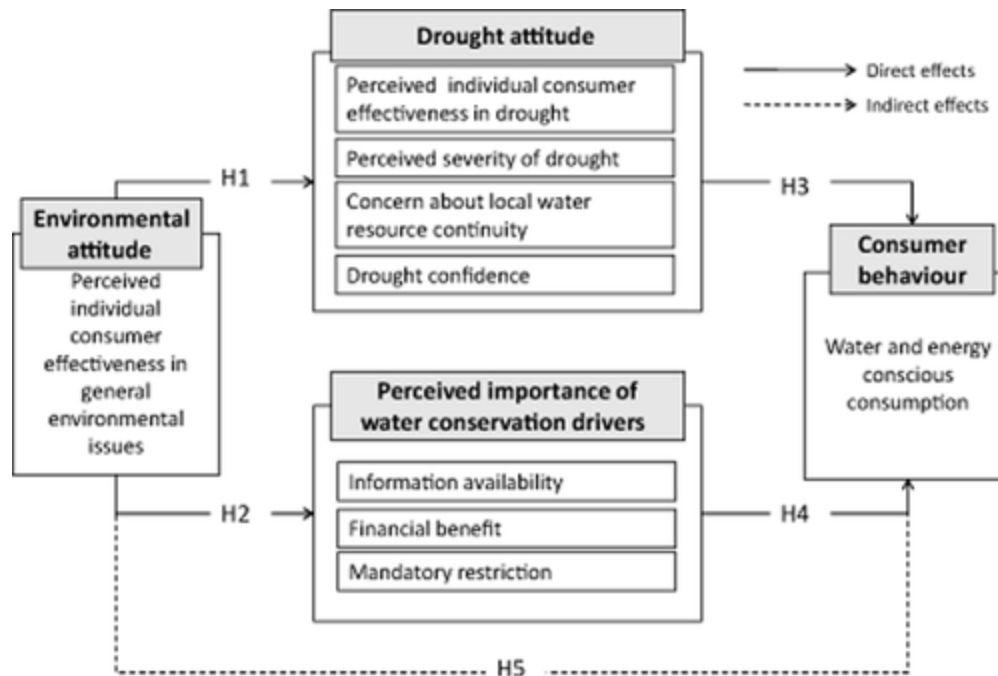


Measures

*Perceived individual consumer effectiveness (PCE) in general environmental issues* was measured with one item, 'Each individual can contribute to a better environment' (1 = strongly disagree; 5 = strongly agree). *Perceived individual consumer effectiveness (PCE) in drought* was measured with one item, 'My own personal actions can have an effect on current and/or future drought conditions'. (1 = strongly disagree; 5 = strongly agree). Each item for these two constructs was adapted from the Organization for Economic Co-Operation and Development (OECD) ([2011](#)) report.

*Perceived severity of drought* was measured with one item, 'How bad is this drought compared with the previous droughts in Texas' (1 = much better; 7 = much worse). *Concern about local water resource continuity* was measured with one item, 'How concerned are you about your local water resources being able to continue providing water to your area?' (1 = very unconcerned; 7 = very concerned). *Drought confidence* was measured with one item, 'When do you think the current drought in Texas will end?' (1 = never; 7 = already ended). The measure for each of the three constructs was created by researchers to reflect Texas residents' attitude towards drought.

*Perceived importance of water conservation drivers* starts with a question, 'How important are the following factors in encouraging you to reduce your water consumption?' The list of six items were as follows: practical information on things you can do to save water at home; money savings; clear importance of the environmental benefits of saving water; availability of water-efficient products; lower cost of water-efficient equipment; mandatory water restrictions (1 = not important at all; 7 = very important). The items were adapted from the Organization for Economic Co-Operation and Development (OECD) ([2011](#)) report.

*Water and energy conscious consumption* was measured with a scale consisting of seven items assessing the extent of consumers' behavioural tendency to consider the amount of water and energy used for maintaining a product and to select a product that allows them to conserve water and/or energy (1 = strongly disagree; 5 = strongly agree). The items are as follows: people should consider the amount of water and/or energy that will be consumed to maintain

the things they purchase; I purposefully select products that let me conserve water and/or energy; I try to limit my use of water and/or energy when performing household tasks; people should consider the amount of water that will be consumed when they buy plants/landscaping; I purposefully select plants/landscaping that allow me to conserve water; people should consider the amount of water and energy that will be required to maintain the clothes they purchase; I purposefully select clothing that allows me to conserve water and/or energy. The items were modified from previous studies on resource conscious behaviour when purchasing and maintaining clothing, landscaping and other household products (Butler and Francis, 1997; Kim and Damhorst, 1998; Webb *et al*., 2008). The steps taken to ensure reliability and validity of the measurements are reported in the Results section.

Analysis

We conducted a series of exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and structural equation modelling. We have both variables measured with multi-items and others measured with a single item, and thus, it was first necessary to conduct EFA to examine basic factor structure of multi-item variables: perceived importance of water conservation drivers and water and energy conscious consumption. Next, a CFA with maximum likelihood was conducted on nine variables to examine the measurement model fit. Lastly, the structural model was estimated for hypothesis testing.

**PART B: Educational Intervention (see education section of the Qualtrics survey in Part A)**

- Intentional design to graphics (colors, logos, positive images that show what people are supposed to do/what the socially desirable 'norm' is)
- Nudges → price comment, healthier comment, and social-norm comment :), :(

**PART C: Results Tables & Graphs, Data cleaning and analysis protocol**

Note:
- Pre-score is the term used to describe our "baseline"
- Post-score is term used to describe the true measure we were interested in testing
- Pre-scores and post-scores are not directly comparable, because there were some slight differences in questions asked.
- Both pre-scores and post-scores are composite scores from the sum of likert scale questions

**A.    Testing Local-geographic v Local-cultural pre- and post-scores: No significance**

**ANOVA - pre-score (composite)**

| Cases | Sum of Squares | df | Mean Square | F | p | η² |
| --- | --- | --- | --- | --- | --- | --- |

| | | | | | | |
|---|---|---|---|---|---|---|
| Experimental Condition | 0.039 | 1 | 0.039 | 0.005 | 0.942 | 0.000 |
| Residual | 465.872 | 65 | 7.167 | | | |

*Note.* Type III Sum of Squares

**Descriptives**

**Descriptives - pre-score (composite)**

| Experimental Condition | Mean | SD | N |
|---|---|---|---|
| Local-cultural | 10.36 | 2.667 | 33 |
| Local-geographic | 10.41 | 2.687 | 34 |

**ANOVA**

**ANOVA - post-score (composite)**

| Cases | Sum of Squares | df | Mean Square | F | p | η² |
|---|---|---|---|---|---|---|
| Experimental Condition | 0.085 | 1 | 0.085 | 0.015 | 0.902 | 0.000 |
| Residual | 365.825 | 65 | 5.628 | | | |

*Note.* Type III Sum of Squares

**Descriptives**

**Descriptives - post-score (composite)**

| Experimental Condition | Mean | SD | N |
|---|---|---|---|
| Local-cultural | 10.58 | 2.398 | 33 |
| Local-geographic | 10.65 | 2.347 | 34 |

**Descriptives**

**Descriptive Statistics**

| | Experimental Condition | pre-score (composite) | post-score (composite) |
|---|---|---|---|
| **Valid** | 67 | 67 | 67 |
| **Missing** | 0 | 0 | 0 |
| **Mean** | | 10.39 | 10.61 |
| **Std. Error of Mean** | | 0.3246 | 0.2877 |
| **Median** | | 10.00 | 11.00 |

| | | |
|---|---|---|
| **Mode** | 8.000 | 11.00 |
| **Std. Deviation** | 2.657 | 2.355 |
| **Variance** | 7.059 | 5.544 |
| **Range** | 11.00 | 10.00 |
| **Minimum** | 5.000 | 6.000 |
| **Maximum** | 16.00 | 16.00 |
| **Sum** | 696.0 | 711.0 |

*Note.* Not all values are available for *Nominal Text* variables

**Frequencies**

**Frequency Tables**

**Frequencies for Experimental Condition**

| Experimental Condition | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Local-cultural | 33 | 49.3 | 49.3 | 49.3 |
| Local-geographic | 34 | 50.7 | 50.7 | 100.0 |
| Missing | 0 | 0.0 | | |
| Total | 67 | 100.0 | | |

**B. Testing L v G v C pre- and post-scores: No significance**

**ANOVA - pre-score (composite)**

| Cases | Sum of Squares | df | Mean Square | F | p | η² |
|---|---|---|---|---|---|---|
| Experimental Condition | 10.96 | 2 | 5.482 | 0.710 | 0.494 | 0.012 |
| Residual | 896.20 | 116 | 7.726 | | | |

*Note.* Type III Sum of Squares

**Descriptives**

**Descriptives - pre-score (composite)**

| Experimental Condition | Mean | SD | N |
|---|---|---|---|
| Control | 9.587 | 2.926 | 46 |
| Global | 9.912 | 2.667 | 34 |
| Local | 10.308 | 2.697 | 39 |

**Descriptives Plot**
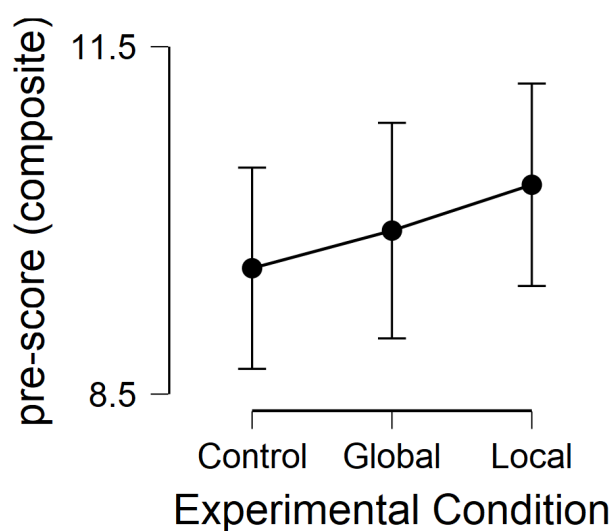
## ANOVA

### ANOVA - post-score (composite)

| Cases | Sum of Squares | df | Mean Square | F | p | η² |
|---|---|---|---|---|---|---|
| Experimental Condition | 10.71 | 2 | 5.353 | 0.586 | 0.558 | 0.010 |
| Residual | 1059.85 | 116 | 9.137 | | | |

*Note.* Type III Sum of Squares

## Descriptives

### Descriptives - post-score (composite)

| Experimental Condition | Mean | SD | N |
|---|---|---|---|
| Control | 11.00 | 3.360 | 46 |
| Global | 10.26 | 3.194 | 34 |
| Local | 10.62 | 2.380 | 39 |

## Descriptives Plot
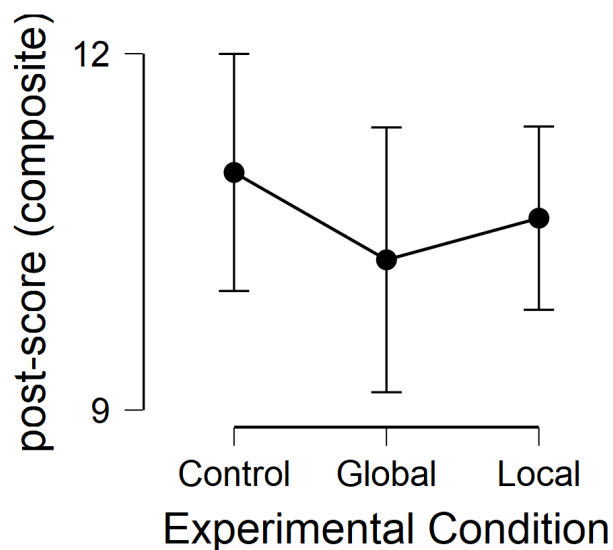
Environmental Education: Geographical Proximity on the Willingness to Change Behaviour



**Descriptives**

**Descriptive Statistics**

| | Experimental Condition | pre-score (composite) | post-score (composite) |
|---|---|---|---|
| **Valid** | 119 | 119 | 119 |
| **Missing** | 0 | 0 | 0 |
| **Mean** | | 9.916 | 10.66 |
| **Std. Error of Mean** | | 0.2542 | 0.2761 |
| **Median** | | 10.00 | 11.00 |
| **Mode** | | 11.00 | 11.00 |
| **Std. Deviation** | | 2.773 | 3.012 |
| **Variance** | | 7.688 | 9.072 |
| **Range** | | 12.00 | 14.00 |
| **Minimum** | | 4.000 | 5.000 |
| **Maximum** | | 16.00 | 19.00 |
| **Sum** | | 1180 | 1269 |

*Note.* Not all values are available for *Nominal Text* variables

**Frequencies**

**Frequency Tables**

**Frequencies for Experimental Condition**

Environmental Education: Geographical Proximity on the Willingness to Change Behaviour

| Experimental Condition | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Control | 46 | 38.7 | 38.7 | 38.7 |
| Global | 34 | 28.6 | 28.6 | 67.2 |
| Local | 39 | 32.8 | 32.8 | 100.0 |
| Missing | 0 | 0.0 | | |
| Total | 119 | 100.0 | | |

## C. Testing willingness to "sign a petition" between groups L x G x C. No significance

| Results | | | | |
|---|---|---|---|---|
| | Yes | No | ||| | *Row Totals* |
| Local | 35 (32.77) [0.15] | 4 (6.23) [0.80] | ||| | 39 |
| Global | 27 (28.57) [0.09] | 7 (5.43) [0.45] | ||| | 34 |
| Control | 38 (38.66) [0.01] | 8 (7.34) [0.06] | ||| | 46 |
| *Column Totals* | 100 | 19 | ||| | **119 (Grand Total)** |

The chi-square statistic is 1.5586. The p-value is .45872. The result is not significant at $p < .05$.

Trends:



Willingness to sign petition (Yes or No) for Conditions (L, G, C)

Environmental Education: Geographical Proximity on the Willingness to Change Behaviour
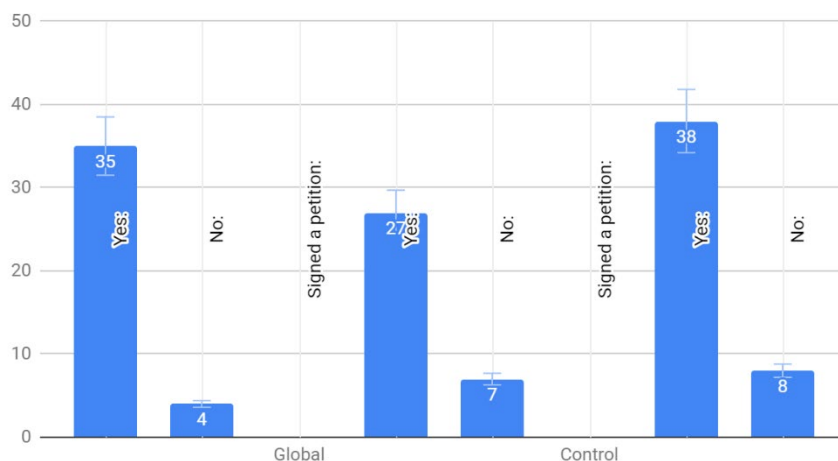
| **"Potential trends: we see the opposite trend than what we were expecting…"** | | |
|---|---|---|
| **% of Yes to local petition in Local condition, compared with Control Condition** | | |
| | **Local condition** | **Control condition** |
| **Yes to local petition** | 80 | 90.9 |
| **Yes to global petition** | 95.83 | 75 |
| **% of Yes to global petition in Global condition, compared with Control Condition** | | |
| | **Global condition** | **Control condition** |
| **Yes to local petition** | 85 | 90.9 |
| **Yes to global petition** | 71 | 75 |

Protocol for data cleaning:

Exclusion criteria:
1. Exclude preview response type (not real survey)
2. Exclude those that didn't finish 96% of the survey
3. Exclude those that are incomplete (aka the participant answered all of the questions that they viewed/were shown). Ex. one survey was marked by Qualtrics as incomplete, but they weren't shown one question at the very end ("write something to show your support") which they didn't answer.

N = 135

*Do not exclude any for duration (only 3 are under 100 seconds, and all seem like valid responses when checking what the survey looked like to the participant in Qualtrics). They were just very fast because the respondents did not see an infographic (they were control), and they were not shown the last question (write a response).

Caroline to inverse questions that were worded oppositely w/ like-art scale (directionality is opposite):

- Questions to invert: orange/red (1-->5)(2-->4)(3-->3)...(low scores are bad, indicate individual is not as likely to be willing to change their behavior)
- QID20 = 5.4 - "I feel that there are too many barriers to lowering my fish/seafood consumption"
- QID21 = 5.5 - "It doesn't really make a difference if I chose to eat sustainably-sourced fish/seafood"
- Questions to disaggregate by later for further analysis: yellow
- QID4 = 2.2 - "How important of a factor is money when it comes to making food choices"
- QID5 = 2.3 - "How much money do you spend on food a day"
- QID10 = 3.2 - "How much do you consider price when you buy seafood"

Exclude data from vegetarians and vegans (remove Q2.1 = 3 (vegetarian) or 4 (vegan), check 5)

Exclude samples with missing data for questions used to make composite scores

Sven to code numeric data into conditions:
- global condition

Caroline to code numeric data into conditions:
- local condition
- control condition

Caroline to sort/dissaggregate numeric data into different spreadsheet conditions and questions, calculate scores, frequencies, etc.
- Global
- Local → Separate geographically local (Q5.7 = 1) from culturally local (Q5.8 = 1)
- Control

Sample sizes:

Local condition total: N = 39
Local condition w/ geographically local sample: N = 34
Local condition w/ culturally local sample: N = 33
Global condition: N = 34
Control condition: N = 46

Caroline to do JASP analysis

UPDATED protocol with additional survey trouble/flaws

Something went arwy with who saw petition questions (local or global petition question was randomly assigned)... thus, testing to see if there were differences (in Yes or No, for local or

| global petition) within the experimental condition. If no difference, results combined into Yes or No for a petition. |
| --- |
|  |

| test to see if differences between Local-geo, Local-cult, Y + N |
| --- |
| if no difference, just use the "Local" condition |
| then, compare L, G, C v Y or N |
| --> not significant |
| if this is significant, do further 2-way testing |
| --> not needed |

For ANOVAS:

| compare local-geog pre and post-scores to local-cult |
| --- |
| if significant, compare each in indiviual anovas to G and C |
| if not significant, group L, and compare to G and C |
| --> results are not significant, so combined L-geog and L-cult to just have L |
| --> (Local-geog v Local-cult ANOVAs) results on document --> not significant |
| --> (L v G v C ANOVAs) results on document --> not significant |

Protocol for data analysis:

Before questions --> we want to pool all respondents from the before questions, and see distribution of the baseline (before) scores?

Composite score = Q3.1, 3.3, 3.4, 3.5
We want to compare baseline/before scores to look to look at over feelings/opinions on the issue:
→ 1-way ANOVA, between groups/conditions
→ compare composite "before" scores?

In Jasp:  .csv file
Individual #s for each question = Ordinal variables are categorical variables with an inherent order. An example might be a Likert preference rating scale with levels 1 ("hate it"), 2 ("yuk"), 3 ("meh"), 4 ("cool"), and 5 ("in love"). Note that the distance between the numbers is not meaningful. JASP assumes that all ordinal variables have been assigned numeric values.

For composite score: Continuous variables are variables with values that allow a meaningful comparison of distance. Examples include income, IQ, or weight.

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- if baseline is similar, we can get direct implications (difference in education does matter)…if baselines are different, we can not make direct implications…our limitations in looking at the differences between the after conditions

MAIN Q is: what type of education matters, not, does education matter

After questions --> are we comparing each individual Q across conditions, or are we comparing composite scores across conditions?

Composite score = Q5.1, 5.2, 5.3, 5.4inverse, 5.5inverse
We want to compare baseline/before scores to look to look at over feelings/opinions on the issue:
→ 1-way ANOVA, between groups/conditions
→ compare composite "after" scores

In Jasp: .csv file
Ordinal variables are categorical variables with an inherent order. An example might be a Likert preference rating scale with levels 1 ("hate it"), 2 ("yuk"), 3 ("meh"), 4 ("cool"), and 5 ("in love"). Note that the distance between the numbers is not meaningful. JASP assumes that all ordinal variables have been assigned numeric values.

Petition Q to compare: 5.6, 6.1, 37 ($x^2$ individually)
→ Chi squared, between groups/conditions (one chi squared for local, one chi squared for global, one chi squared for control)
→ look at frequency of Y and N for signing petitions

In socialstats website: Nominal Text (variables are categorical variables without numeric value)