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Climate Change Hope Scale: Factor Analysis in an Adult Sample

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Climate Change Hope Scale: Factor Analysis in an Adult Sample

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Introduction

- *Willpower* - how much individuals believe that set goals can be met.
- *Waypower* - the extent to which individuals can think of strategies for accomplishing those goals.
- The Climate Change Hope Scale (CCHS; Li & Monroe, 2017) was designed to measure three aspects of hope:
 - Personal sphere willpower and waypower (PW)
 - Collective sphere willpower and waypower (CW)
 - Lack of willpower and waypower (LW)
- A three-factor model fits the CCHS among adolescents.
- The purpose of our study was to determine if the three-factor model fits the CCHS in adults.

Method

- 500 MTurk workers were recruited through CloudResearch. After filtering out 15 climate change deniers, we were left with a sample of 485 adults, aged 18-76 (M = 39.63, SD = 11.81).
- We filtered out multivariate outliers (those with Mahalanobis distances with p-values < .001).
- The Climate Change Hope Scale (CCHS) has 11 items, which are answered using a 7-point agreement scale (1 = strongly disagree, 7 = strongly agree).
- Participants completed the CCHS in an online survey format from their own computer.
- The fit of Li and Monroe's three-factor model was assessed using a confirmatory factor analysis using the R package *lavaan*.
- The goodness-of-fit were evaluated using the Root Mean Square Error of Approximation (RMSEA), Bentler's Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI).
- Good fit would be indicated by RMSEA \leq .06, CFI $>$.95, TLI $>$.95
- Table 1 displays the item wordings and the item-factor relationships as specified by Li and Monroe (2017).

Results

- The three-factor model fit well. RMSEA = .04, CFI = .99, and TLI = .99.

Discussion

- Previous research has shown that the three-factor model fits adolescent samples. Our results show the three-factor model also fits an adult sample. Thus, test users are justified in calculating the same scale scores in adults as they do in adolescents.
- Our sample was collected in the United States. Future research could be done in other countries to confirm that the factor structure is the same.
- Additionally, 83% of our sample identified as Caucasian/White. Future research could be done with other ethnic groups to confirm that the factor structure remains the same.
- Notwithstanding these limitations, the CCHS is a promising measure of climate change hope. Future research can use this measure to examine the relationship between hope and variables such as personal experience of the effects of climate change and taking action to mitigate its effects.

The Climate Change Hope Scale has three factors among adults.

Table 1

CCHS Items and Their Factors

Item	Description	Factor
1	I believe people will be able to solve problems caused by climate change	CW
2	I believe scientists will be able to find ways to solve problems caused by climate change	CW
3	Even when some people give up, I know there will be others who will continue to try to solve problems caused by climate change	CW
4	If everyone works together, we can solve problems caused by climate change	CW
5	I am willing to take actions to help solve problems caused by climate change	PW
6	I believe more people are willing to take actions to help solve problems caused by climate change	CW
7	I know that there are things that I can do to help solve problems caused by climate change	PW
8	I know what to do to help solve problems caused by climate change	PW
9	Climate change is beyond my control, so I won't even bother trying to solve problems caused by climate change	LW
10	Climate change is so complex we will not be able to solve problems that it causes	LW
11	The actions I can take are too small to help solve problems caused by climate change	LW

Note. PW= Personal Willpower and Waypower, CW= Collective Willpower and Waypower, and LW= Lack of Willpower and Waypower.

Table 2

Goodness-of-Fit Indices of CFA on CCHS in Adults

Indices	Criterion	CCHS
RMSEA	\leq .06	.04
CFA	$>$.95	.99
TLI	$>$.95	.99

Note. CFA = Confirmatory Factor Analysis; CCHS = Climate Change Hope Scale. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.

Figure 1

CFA Model Representing Three-Factor Structure of CCHS from Li and Monroe (2017)

