

Bedyńska et al. (2018)

If the study has a broad focus and this data extraction focuses on just one component of the study, please specify this here

☒ Not applicable (whole study is focus of data extraction)

Study aim(s) and rationale

Was the study informed by, or linked to, an existing body of empirical and/or theoretical research?

☒ Explicitly stated (please specify)

The study was explicitly informed by existing research on stereotype threat, working memory, and intellectual helplessness. The authors cite numerous previous studies on these topics to build their rationale and hypotheses.

Do authors report how the study was funded?

☒ Explicitly stated (please specify)

The study was funded by the European Social Fund (Human Capital Operational Program 2007–2013) and the National Science Centre, Poland (Grant 2015/17/B/HS6/04185).

Study research question(s) and its policy or practice focus

What is/are the topic focus/foci of the study?

The study focuses on chronic stereotype threat and its effects on mathematical achievement, working memory, and intellectual helplessness in secondary school girls.

What is/are the population focus/foci of the study?

The population focus is female secondary school students in Poland.

What is the relevant age group?

☒ 11 - 16

The mean age of participants was 15.59 years (SD = 0.92).

What is the sex of the population focus/foci?

☒ Female only

What is/are the educational setting(s) of the study?

- ☒ Secondary school

In Which country or countries was the study carried out?

- ☒ Explicitly stated (please specify)

The study was carried out in Poland.

Please describe in more detail the specific phenomena, factors, services, or interventions with which the study is concerned

The study examines chronic stereotype threat and its relationships with mathematical achievement, working memory functions, and intellectual helplessness in secondary school girls. It also looks at gender identification as a moderator of these relationships.

What are the study research questions and/or hypotheses?

- ☒ Explicitly stated (please specify)

The main hypotheses were: 1. Chronic stereotype threat is negatively associated with mathematical achievement. 2. Working memory mediates the relationship between chronic stereotype threat and mathematical achievement. 3. Intellectual helplessness mediates the relationship between chronic stereotype threat and mathematical achievement. 4. Gender identification moderates the effects of chronic stereotype threat.

Methods - Design***Which variables or concepts, if any, does the study aim to measure or examine?***

- ☒ Explicitly stated (please specify)

The study measures: - Chronic stereotype threat - Mathematical achievement (school grades) - Working memory functions (storage and processing, supervision, relational integration) - Intellectual helplessness - Gender identification

Study timing

- ☒ Cross-sectional

If the study is an evaluation, when were measurements of the variable(s) used for outcome made, in relation to the intervention?

- ☒ Not applicable (not an evaluation)

Methods - Groups***If comparisons are being made between two or more groups, please specify the basis of any divisions made for making these comparisons.***

- ☒ No prospective allocation but use of pre-existing differences to create comparison groups (e.g. receiving different interventions, or characterised by different levels of a variable such as social class)

The study examines differences based on levels of chronic stereotype threat, gender identification, and working memory capacity.

How do the groups differ?

- ☒ Implicit (please specify)

Groups differ based on levels of chronic stereotype threat, gender identification, and working memory capacity, though these are continuous variables rather than discrete groups.

Number of groups

- ☒ Other/unclear (please specify)

The study uses continuous variables rather than discrete groups.

Was the assignment of participants to interventions randomised?

- ☒ Not applicable (not more than one group)

Where there was prospective allocation to more than one group, was the allocation sequence concealed from participants and those enrolling them until after enrolment?

- ☒ Not applicable (no prospective allocation)

Apart from the experimental intervention, did each study group receive the same level of care (that is, were they treated equally)?

- ☐ Yes
☐ No
☒ Can't tell

This is not applicable as there was no experimental intervention.

Study design summary

This was a cross-sectional correlational study using structural equation modeling to examine relationships between chronic stereotype threat, mathematical achievement, working memory, intellectual helplessness, and gender identification in a sample of secondary school girls.

Methods - Sampling strategy

Are the authors trying to produce findings that are representative of a given population?

- ☒ Explicitly stated (please specify)

The authors used a stratified random sampling procedure to obtain a representative sample of secondary school girls from two regions of Poland.

Which methods does the study use to identify people or groups of people to sample from and what is the sampling frame?

☒ Explicitly stated (please specify)

The sampling frame was secondary schools in two regions of Poland. Schools were randomly sampled with stratification based on region and school location (village, small city, medium city).

Which methods does the study use to select people or groups of people (from the sampling frame)?

☒ Explicitly stated (please specify)

After selecting schools, classes within each school were randomly selected and all female students in those classes were invited to participate.

Planned sample size

☒ Not stated/unclear (please specify)

The planned sample size is not explicitly stated.

Methods - Recruitment and consent

Which methods are used to recruit people into the study?

☒ Explicitly stated (please specify)

Students were recruited through their schools and classes that were randomly selected.

Were any incentives provided to recruit people into the study?

☒ Not stated/unclear (please specify)

The use of incentives is not mentioned.

Was consent sought?

☒ Participant consent sought

☒ Parental consent sought

Are there any other details relevant to recruitment and consent?

☒ Yes (please specify)

The study was presented as aimed at testing new online educational games. Students were informed about anonymity and voluntary participation.

Methods - Actual sample

What was the total number of participants in the study (the actual sample)?

☒ Explicitly stated (please specify)

624 female students participated in the study.

What is the proportion of those selected for the study who actually participated in the study?

☒ Explicitly stated (please specify)

655 female students were initially selected, and 624 participated, representing about 95% participation rate.

Which country/countries are the individuals in the actual sample from?

☒ Explicitly stated (please specify)

All participants were from Poland.

What ages are covered by the actual sample?

☒ Not stated/unclear (please specify)

The exact age range is not stated, but the mean age was 15.59 years ($SD = 0.92$).

What is the socio-economic status of the individuals within the actual sample?

☒ Not stated/unclear (please specify)

Socio-economic status is not reported.

What is the ethnicity of the individuals within the actual sample?

☒ Not stated/unclear (please specify)

Ethnicity is not reported.

What is known about the special educational needs of individuals within the actual sample?

☒ Not stated/unclear (please specify)

Special educational needs are not reported.

Is there any other useful information about the study participants?

☒ Not stated/unclear (please specify)

No other notable information about the participants is provided.

How representative was the achieved sample (as recruited at the start of the study) in relation to the aims of the sampling frame?

☒ Medium (please specify)

The sample appears moderately representative as it used stratified random sampling, but some bias may exist due to the 5% non-participation rate.

If the study involves studying samples prospectively over time, what proportion of the sample dropped out over the course of the study?

☒ Not applicable (not following samples prospectively over time)

For studies that involve following samples prospectively over time, do the authors provide any information on whether and/or how those who dropped out of the study differ from those who remained in the study?

☒ Not applicable (not following samples prospectively over time)

If the study involves following samples prospectively over time, do authors provide baseline values of key variables such as those being used as outcomes and relevant socio-demographic variables?

☒ Not applicable (not following samples prospectively over time)

Methods - Data collection

Please describe the main types of data collected and specify if they were used (a) to define the sample; (b) to measure aspects of the sample as findings of the study?

☒ Details

Data collected included: (a) To define the sample: gender, age, school information (b) To measure aspects of the sample: chronic stereotype threat, mathematical achievement (grades), working memory test scores, intellectual helplessness, gender identification

Which methods were used to collect the data?

- ☒ Self-completion questionnaire
- ☒ Psychological test
- ☒ School/college records (e.g. attendance records etc)

Details of data collection methods or tool(s).

☒ Explicitly stated (please specify)

The study used: - Functional Aspects of Working Memory Test (FAWMT) - Intellectual Helplessness Scale (short version) - Chronic Stereotype Threat Scale - Single-item measure of gender identification - Mathematical achievement measured by Grade Point Average

Who collected the data?

☒ Not stated/unclear

Do the authors describe any ways they addressed the reliability of their data collection tools/methods?

☒ Details

The authors report Cronbach's alpha for the Intellectual Helplessness Scale ($\alpha = 0.80$) and the Chronic Stereotype Threat Scale ($\alpha = 0.89$).

Do the authors describe any ways they have addressed the validity of their data collection tools/methods?

☒ Details

The authors report construct validity for the Chronic Stereotype Threat Scale using confirmatory factor analysis.

Was there concealment of study allocation or other key factors from those carrying out measurement of outcome – if relevant?

☒ Not applicable (please say why)

This was not an experimental study with allocation to conditions.

Where were the data collected?

☒ Explicitly stated (please specify)

Data was collected in schools during regular school hours.

Are there other important features of data collection?

☒ Details

Data was collected in a single 45-minute session.

Methods - Data analysis

Which methods were used to analyse the data?

☒ Explicitly stated (please specify)

The study used structural equation modeling with complex sampling and Maximum Likelihood Robust approach.

Which statistical methods, if any, were used in the analysis?

☒ Details

The study used structural equation modeling, moderated multiple mediation analysis, and confirmatory factor analysis.

What rationale do the authors give for the methods of analysis for the study?

☒ Details

The authors state they used structural equation modeling to deal with clustered data and non-normally distributed variables.

For evaluation studies that use prospective allocation, please specify the basis on which data analysis was carried out.

☒ Not applicable (not an evaluation study with prospective allocation)

Do the authors describe any ways they have addressed the reliability of data analysis?

☒ Details

The authors used robust methods (Maximum Likelihood Robust) to address non-normality of data.

Do the authors describe any ways they have addressed the validity of data analysis?

☒ Details

The authors used multiple fit indices to evaluate the structural equation models.

Do the authors describe strategies used in the analysis to control for bias from confounding variables?

☒ Details

The authors included gender identification as a moderator to control for its effects.

Please describe any other important features of the analysis.

☒ Details

The authors used 95% confidence intervals to determine significance of indirect effects.

Please comment on any other analytic or statistical issues if relevant.

☒ Details

The authors note potential limitations due to the cross-sectional nature of the data.

Results and Conclusions

How are the results of the study presented?

☒ Details

Results are presented in text, tables, and a structural equation model diagram.

What are the results of the study as reported by authors?☒ Details

Key findings include: - Chronic stereotype threat was negatively associated with mathematical achievement - Working memory and intellectual helplessness mediated the relationship between chronic stereotype threat and mathematical achievement - These effects were only significant for girls highly identified with their gender group

Was the precision of the estimate of the intervention or treatment effect reported?

- CONSIDER:
 - Were confidence intervals (CIs) reported?

☒ Yes

The authors report 95% confidence intervals for indirect effects.

Are there any obvious shortcomings in the reporting of the data?☒ No***Do the authors report on all variables they aimed to study as specified in their aims/research questions?***☒ Yes (please specify)

The authors report on all variables specified in their research questions.

Do the authors state where the full original data are stored?☒ No***What do the author(s) conclude about the findings of the study?***☒ Details

The authors conclude that chronic stereotype threat is associated with lower mathematical achievement, mediated by working memory depletion and intellectual helplessness, but only for girls highly identified with their gender group.

Quality of the study - Reporting***Is the context of the study adequately described?***☒ Yes (please specify)

The authors provide a thorough background on stereotype threat, working memory, and intellectual helplessness research.

Are the aims of the study clearly reported?☒ Yes (please specify)

The aims and hypotheses of the study are clearly stated.

Is there an adequate description of the sample used in the study and how the sample was identified and recruited?

☒ Yes (please specify)

The sampling and recruitment procedures are described in detail.

Is there an adequate description of the methods used in the study to collect data?

☒ Yes (please specify)

The data collection methods and measures are described in detail.

Is there an adequate description of the methods of data analysis?

☒ Yes (please specify)

The data analysis methods are described in detail, including the statistical techniques used.

Is the study replicable from this report?

☒ Yes (please specify)

The methods are described in sufficient detail to allow replication.

Do the authors avoid selective reporting bias?

☒ Yes (please specify)

The authors report on all variables and analyses mentioned in their aims and hypotheses.

Quality of the study - Methods and data

Are there ethical concerns about the way the study was done?

☒ No concerns

Were students and/or parents appropriately involved in the design or conduct of the study?

☒ No (please specify)

There is no mention of student or parent involvement in the study design or conduct.

Is there sufficient justification for why the study was done the way it was?

☒ Yes (please specify)

The authors provide a clear rationale for their study design and methods based on previous research.

Was the choice of research design appropriate for addressing the research question(s) posed?

☒ Yes (please specify)

The cross-sectional design with structural equation modeling was appropriate for examining relationships between the variables of interest.

To what extent are the research design and methods employed able to rule out any other sources of error/bias which would lead to alternative explanations for the findings of the study?

☒ A little (please specify)

While the study uses appropriate methods, its cross-sectional nature limits causal inferences.

How generalisable are the study results?

☒ Details

The results may be generalisable to female secondary school students in Poland, but caution should be used in generalizing to other populations or countries.

Weight of evidence - A: Taking account of all quality assessment issues, can the study findings be trusted in answering the study question(s)?

☒ Medium trustworthiness (please specify)

The study uses appropriate methods and analyses, but its cross-sectional nature and potential sample biases limit full trustworthiness.

Have sufficient attempts been made to justify the conclusions drawn from the findings so that the conclusions are trustworthy?

☒ Medium trustworthiness

The authors discuss their findings in relation to previous research and theory, but acknowledge limitations of their study design.

References

- Bedyńska, S., Krejtz, I., & Sedek, G. (2018). Chronic stereotype threat is associated with mathematical achievement on representative sample of secondary schoolgirls: The role of gender identification, working memory, and intellectual helplessness. *Frontiers in Psychology*, 9, 428. <https://doi.org/10.3389/fpsyg.2018.00428>