

SEM Report — Title

Student Name

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1 Research question

Write 3–6 lines: - What is the substantive question? - What are the constructs? - What would be convincing evidence?

2 Data

2.1 Sample

- N =
- Inclusion/exclusion =
- Grouping variable (if any) =
- Clustering (if any) = (e.g., students in classrooms)

2.2 Variables

Brief table (optional): - Indicators for each latent factor - Outcomes/predictors - Scale type (continuous vs ordinal Likert)

2.3 Missingness

- % missing overall =
- Key variables with missingness =
- Strategy (FIML / MI / listwise) + short justification

```
# Optional quick checks (edit to match your data)
# summary(dat)
# colMeans(is.na(dat))
```

3 Model

3.1 Conceptual model (diagram)

Insert a figure if you have one:

3.2 lavaan syntax

```
library(lavaan)

model <- '
  # Measurement
  f1 =~ x1 + x2 + x3
  f2 =~ y1 + y2 + y3

  # Structural
  f2 ~ f1
'
```

4 Estimation choices

Report and justify:

- **Estimator:** (e.g., ML / MLR / WLSMV)
- **Ordered indicators:** (yes/no; which variables)
- **Standardization:** (e.g., std.lv=TRUE or marker variable)
- **Missing data handling:** (FIML / MI)
- **Cluster-robust SE** (if clustered): yes/no; rationale

```
# Example fit call (edit as needed)
# fit <- sem(model, data = dat, estimator = "MLR", missing = "fiml")
# summary(fit, fit.measures = TRUE, standardized = TRUE)
```

5 Results

5.1 Global fit

Report a small set consistently (and add CI where relevant): - $\chi^2(df) =$ - CFI = - TLI = - RMSEA [90% CI] = - SRMR =

```
# Example
# fitMeasures(fit, c("chisq","df","cfi","tli","rmsea","rmsea.ci.lower","rmsea.ci.upper","srmr"))
```

5.2 Key parameters

Focus on the parameters tied to your research question. - Main paths (standardized estimates + CI) - Loadings (and any problematic indicators) - R² for outcomes

```
# Example: parameter table  
# pe <- parameterEstimates(fit, standardized = TRUE)  
# pe[pe$op %in% c("~", "=~"), c("lhs", "op", "rhs", "est", "se", "pvalue", "std.all")]
```

5.3 Interpretation (write-up)

Write 1–2 short paragraphs: - What do the results mean substantively? - Are effects small/medium/large in context? - What alternative explanations remain?

Include citations when relevant, e.g. ([rosseel2012lavaan?](#)).

6 Diagnostics and respecification (if applicable)

State what you checked: - Residuals inspected? yes/no - Modification indices used? yes/no
If yes: what changes were made and why they are substantively defensible?

```
# Example (optional)  
# modindices(fit, sort. = TRUE, maximum.number = 10)
```

7 Robustness / sensitivity checks (optional but appreciated)

Examples: - Alternative estimator (MLR vs ML) - Treat Likert as ordered vs continuous - With/without a debated residual covariance - With/without outliers

8 Limitations

- Design limits (causality, measurement, sample, generalizability)
- Model dependence / equivalent models
- Potential violations (non-normality, MNAR, clustering not modeled)

9 Conclusion

2–4 bullet points: - What did you learn? - What is the main takeaway for the research question? - What would you do next?

10 Reproducibility

```
sessionInfo()
```

```
R version 4.5.1 (2025-06-13 ucrt)
Platform: x86_64-w64-mingw32/x64
Running under: Windows 11 x64 (build 26100)

Matrix products: default
  LAPACK version 3.12.1

locale:
[1] LC_COLLATE=Italian_Italy.utf8  LC_CTYPE=Italian_Italy.utf8
[3] LC_MONETARY=Italian_Italy.utf8 LC_NUMERIC=C
[5] LC_TIME=Italian_Italy.utf8

time zone: Europe/Rome
tzcode source: internal

attached base packages:
[1] stats      graphics   grDevices utils      datasets   methods    base

other attached packages:
[1] lavaan_0.6-19

loaded via a namespace (and not attached):
[1] digest_0.6.37    fastmap_1.2.0    xfun_0.52      knitr_1.50
[5] htmltools_0.5.8.1 pbivnorm_0.6.0   rmarkdown_2.29  stats4_4.5.1
[9] cli_3.6.5       mnormt_2.1.1    compiler_4.5.1 rstudioapi_0.17.1
[13] tools_4.5.1     evaluate_1.0.4   yaml_2.3.10    quadprog_1.5-8
[17] rlang_1.1.6     jsonlite_2.0.0
```

10.1 References