What is Poisson regression and how can it be applied in Mplus?

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Poisson regression is a statistical method used to model count data, where the outcome variable is a count or rate of events occurring within a specific time period or area. It is commonly used in situations where the outcome variable is non-negative and follows a Poisson distribution. In Mplus, Poisson regression can be applied to analyze count data in structural equation models, multilevel models, and path models. This allows researchers to examine the relationship between one or more predictor variables and a count outcome variable, while taking into account the potential influence of other variables in the model. Poisson regression in Mplus is a useful tool for understanding the factors that may contribute to the occurrence of events or behaviors, and can provide valuable insights for decision making in various fields such as public health, education, and social sciences.

Poisson Regression | Mplus Annotated Output

This page shows an example of poisson regression with footnotes explaining the output. First an example is shown using Stata, and then an example is shown using Mplus, to help you relate the output you are likely to be familiar with (Stata) to output that may be new to you (Mplus). We suggest that you view this page using two web browsers so you can show the page side by side showing the Stata output in one browser and the corresponding Mplus output in the other browser.

This example is from the Mplus User's Guide (example

**3.7) and we suggest that
you see the Mplus User's Guide for more details about this example. We thank the
kind people at Muthén & Muthén for permission to use examples from their manual.**

Example Using Stata

**Here is a logit regression example using Stata with two continuous predictors
x1 and x2 used to predict a binary outcome variable, u1.**

```
infile u1 x1 x3 using https://stats.idre.ucla.edu/wp-content/uploads/2016/02/ex3.7.dat, clear

poisson u1 x1 x3

Iteration 0: log likelihood = -966.8842
Iteration 1: log likelihood = -966.88398
Iteration 2: log likelihood = -966.88398

Poisson regression Number of obs = 500
LR chi2(2) = 631.98
Prob > chi2 = 0.0000
```

Log likelihood = -966.88398 Pseudo R2 = 0.2463

--

u1 | Coef. Std. Err. z P>|z|

-------------+--

x1 | .5330611C .0237869 22.41 0.000 .4864395 .5796827

x3 | .2494125C .0248628 10.03 0.000 .2006822 .2981427

_cons | 1.025773D .0283819 36.14 0.000 .9701454 1.0814

--

estat ic

Model | Obs ll(null) ll(model)A df AICB BICB

-------------+---

. | 500 -1282.874 -966.884 3 1939.768 1952.412

The output is labeled with superscripts to help you relate the later Mplus output to this Stata output. To summarize the output, both predictors in this model, x1 and x3, are significantly related to the outcome variable, u1. The estat ic command produces fit indices for the

model including the log likelihood for the empty (null) model, the log
likelihood for the model, as well as the AIC and BIC fit indices.

Mplus Example #1

Here is the same example illustrated in Mplus based on the https://stats.idre.ucla.edu/wp-content/uploads/2016/02/ex3.7.dat data file.

```
TITLE:
this is an example of a Poisson regression
for a count dependent variable with two
covariates
DATA:
FILE IS
https://stats.idre.ucla.edu/wp-content/uploads/2016/02/ex3.7.dat;
VARIABLE:
NAMES ARE u1 x1 x3;
COUNT IS u1;
MODEL:
```

u1 ON x1 x3;

SUMMARY OF ANALYSIS

Number of observations 500

THE MODEL ESTIMATION TERMINATED NORMALLY

TESTS OF MODEL FIT

Loglikelihood

H0 Value -966.884A

Information Criteria

Number of Free Parameters 3

Akaike (AIC) 1939.768B

Bayesian (BIC) 1952.412B

Sample-Size Adjusted BIC 1942.890

(n* = (n + 2) / 24)

MODEL RESULTS

Estimates S.E. Est./S.E.

U1 ON

X1 0.533C 0.027 19.808

X3 0.249C 0.025 9.788

Intercepts

U1 1.026D 0.030 34.080