Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. (3852 citations as of 4/1/2106)

Online comments by Yoshio Takane

Psychometric Society, Asheville, NC, July, 2016

How Akaike (1987) Came to Be

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. (3852 citations as of 4/1/2106)

Online comments by Yoshio Takane

In his online comments on Akaike (1987), Yoshio Takane relates the story of how this highly-cited paper came to appear in *Psychometrika*.

As President-Elect of the Psychometric Society in 1986, Yoshio was given the usual president's discretionary fund of $1000 to help support the annual meeting to be held in Toronto.

Yoshio used the discretionary $1000 to bring Professor Akaike from Japan to the Toronto meeting.

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. (3852 citations as of 4/1/2106)

Online comments by Yoshio Takane

Ham Bozdogan and Yoshio Takane organized a session for the Toronto meeting on the AIC (Akaike Information Criterion) and its relatives.

Besides Akaike (1987), this session also included papers from Ham Bozodogan and Stanley Sclove (both of which are highly cited in their own right).

The then editor of *Psychometrika*, Ivo Molenaar, asked Yoshio and Ham to make a special section in the journal for the papers presented at the Toronto meeting (the issue of September, 1987).

What Akaike (1987) Does

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. (3852 citations as of 4/1/2106)

Online comments by Yoshio Takane

Akaike (1987) uses the AIC for determining the number of factors to retain in a factor analysis.

AIC: -2log(maximized likelihood) + 2(number of parameters)

This turns out not to be a straightforward application of AIC model selection.

As the number of factors is increased, improper solutions appear (that is, Heywood cases where negative estimates of unique variances are obtained).

Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, *52*, 317–332. (3852 citations as of 4/1/2106)

Online comments by Yoshio Takane

As Takane discusses in some detail, Akaike suggested an awkward maximum penalized likelihood estimation strategy, where an appended penalty term was used to keep the variance estimates positive.

Takane also discusses later work that tried to remove some of this initial awkwardness by using what is called the BIC (Bayesian Information Criterion) and the CAIC (Corrected AIC).