



社会网络分析

案例：Bootstrap中介效应检验

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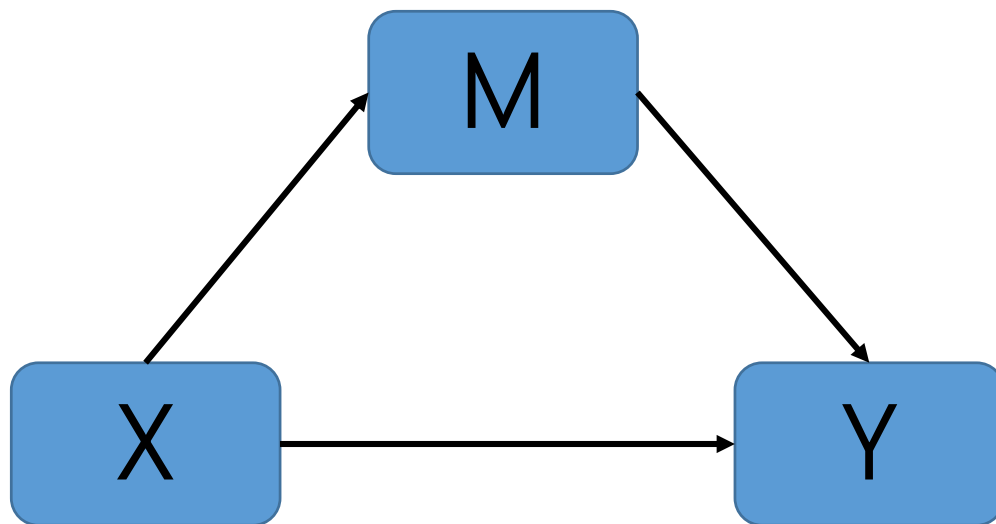
inebm.cn



问题

中介效应是指变量间的影响关系 ($X \rightarrow Y$) 不是直接的因果链关系而是通过一个或一个以上变量(M)的间接影响产生的。M为中介变量，X通过M对Y产生的的间接影响称为中介效应。

中介效应如何检验？



思路



0 文献学习



1 模型假设



2 Bootstrap

0 文献学习



Bing Ma, Shanshi Liu, Hermann Lassleben, Guimei Ma, (2019) "The relationships between job insecurity, psychological contract breach and counterproductive workplace behavior: Does employment status matter?", *Personnel Review*, Vol. 48 Issue: 2, pp.595-610, <https://doi.org/10.1108/PR-04-2018-0138>

Purpose The purpose of this paper is to examine the **mediating effect** of psychological contract breach on the relationship between job insecurity and counterproductive workplace behavior (CWB) and the **moderating effect** of employment status in this relationship. **Design/methodology/approach** Data were collected from 212 supervisor–subordinate dyads in a large Chinese state-owned air transportation group. AMOS 17.0 software was used to examine the hypothesized predictions and the theoretical model. **Findings** The results showed that psychological contract breach partially mediates the effect of job insecurity on CWB, including organizational counterproductive workplace behavior and interpersonal counterproductive workplace behavior. In addition, the relationships between job insecurity, psychological contract breach and CWB differ significantly between permanent workers and contract workers. **Originality/value** The present study provides a new insight into explaining the linkage between job insecurity and negative work behaviors as well as suggestions to managers on minimizing the harmful effects of job insecurity.



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H1. Job insecurity is positively related to CWB-O.

H2. Job insecurity is positively related to CWB-I.

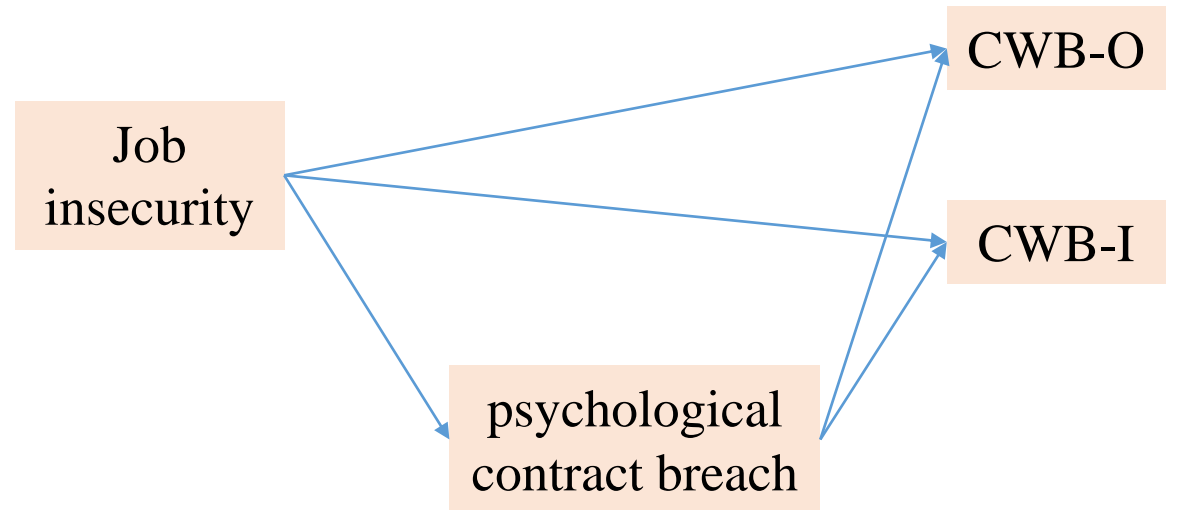
H3. Job insecurity is positively related to psychological contract breach.

H4. Psychological contract breach mediates the relationship between job insecurity and CWB-O.

H5. Psychological contract breach mediates the relationship between job insecurity and CWB-I.

H6. The relationships between job insecurity, psychological contract breach and CWB-O differ between permanent workers and contract workers.

H7. The relationships between job insecurity, psychological contract breach and CWB-I differ between permanent workers and contract workers





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We conducted a CFA to examine convergent and discriminant validity of the key variables. Results showed that the hypothesized four-factor model (job insecurity, psychological contract breach, CWB-O and CWB-I) fitted the data well

Confirmatory factor analyses	Model	Factors	χ^2	df	χ^2/df	CFI	TLI	RMSEA
	Baseline model	Job insecurity, psychological contract breach, CWB-O and CWB-I	595.492	293	2.032	0.946	0.940	0.070
	Three-factor model	CWB-O and CWB-I were combined into one factor	1,346.557	296	4.549	0.811	0.792	0.130
	Three-factor model	Job insecurity and psychological contract breach were combined into one factor	1,062.523	296	3.590	0.862	0.849	0.111
	Two-factor model	Job insecurity and psychological contract breach were combined into one factor, CWB-O and CWB-I were combined into the other factor	1,812.541	298	6.082	0.727	0.703	0.155
	Two-factor model	Job insecurity and CWB-O were combined into one factor, psychological contract breach and CWB-I were combined into the other factor	1,654.420	298	5.552	0.756	0.734	0.147
	One-factor model	All the measures were combined into one factor	2,332.601	299	7.801	0.634	0.602	0.180



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Table II.
Descriptive statistics
and correlations

Variables	Permanent workers		Contract workers		Total Workers		1	2	3	4
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
1. Job insecurity	2.389	0.617	2.907	0.739	2.638	0.725	1			
2. Psychological contract breach	2.355	0.677	2.510	0.821	2.429	0.752	0.408***	1		
3. CWB-O	2.098	0.656	2.265	0.796	2.178	0.730	0.488***	0.421***	1	
4. CWB-I	2.001	0.713	2.078	0.817	2.038	0.764	0.539***	0.455***	0.736***	1

Note: *** $p < 0.001$

Table III.
Comparison of
structural models

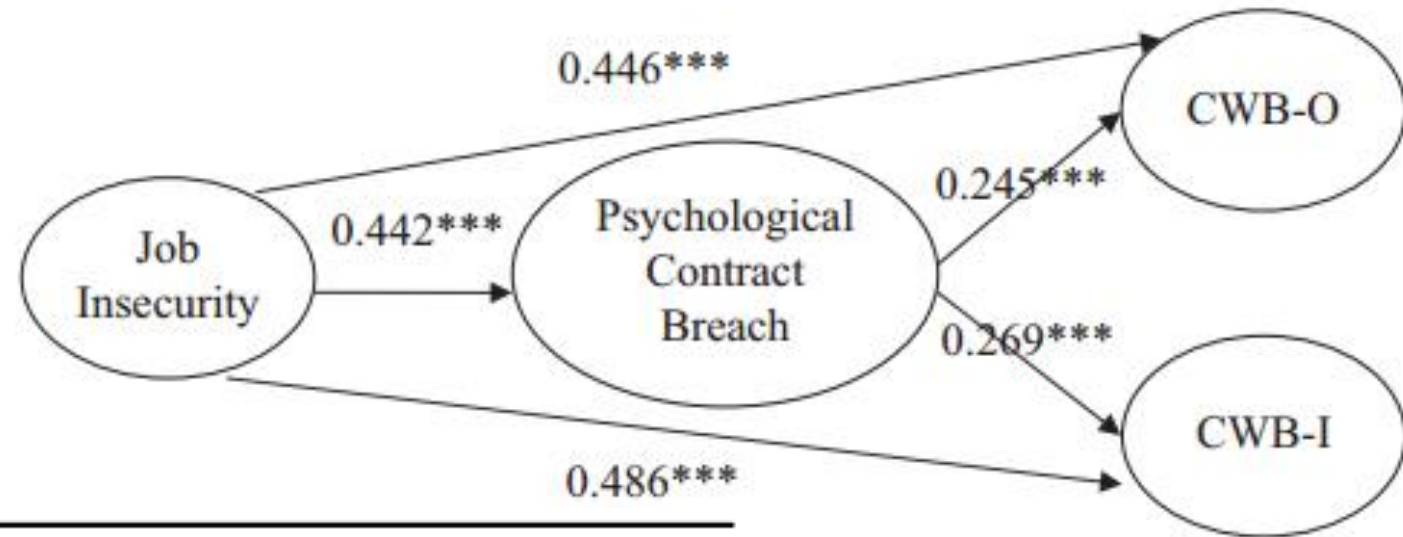
	χ^2	df	χ^2/df	CFI	TLI	RMSEA	AIC	ECVI
Model 1	<i>684.446</i>	<i>294</i>	<i>2.328</i>	<i>0.930</i>	<i>0.922</i>	<i>0.079</i>	<i>798.446</i>	<i>3.784</i>
Model 2	731.935	295	2.481	0.921	0.913	0.084	843.935	4.000
Model 3	721.701	295	2.446	0.923	0.915	0.083	833.701	3.951
Model 4	760.201	296	2.568	0.916	0.908	0.086	870.201	4.124

Note: Italic face type represents the final model

Model 1 was the best model

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Final model for total workers



Model pathways	Estimated effect	95% confidence interval	
		Lower bounds	Upper bounds
<i>Direct effects</i>			
Job insecurity → psychological contract breach	0.442	0.321	0.551
Job insecurity → CWB-O	0.446	0.322	0.570
Job insecurity → CWB-I	0.486	0.364	0.606
<i>Indirect effects</i>			
Job insecurity → psychological contract breach → CWB-O	0.108	0.036	0.179
Job insecurity → psychological contract breach → CWB-I	0.119	0.060	0.187
<i>Total effects</i>			
Job insecurity → CWB-O	0.555	0.432	0.653
Job insecurity → CWB-I	0.605	0.497	0.704

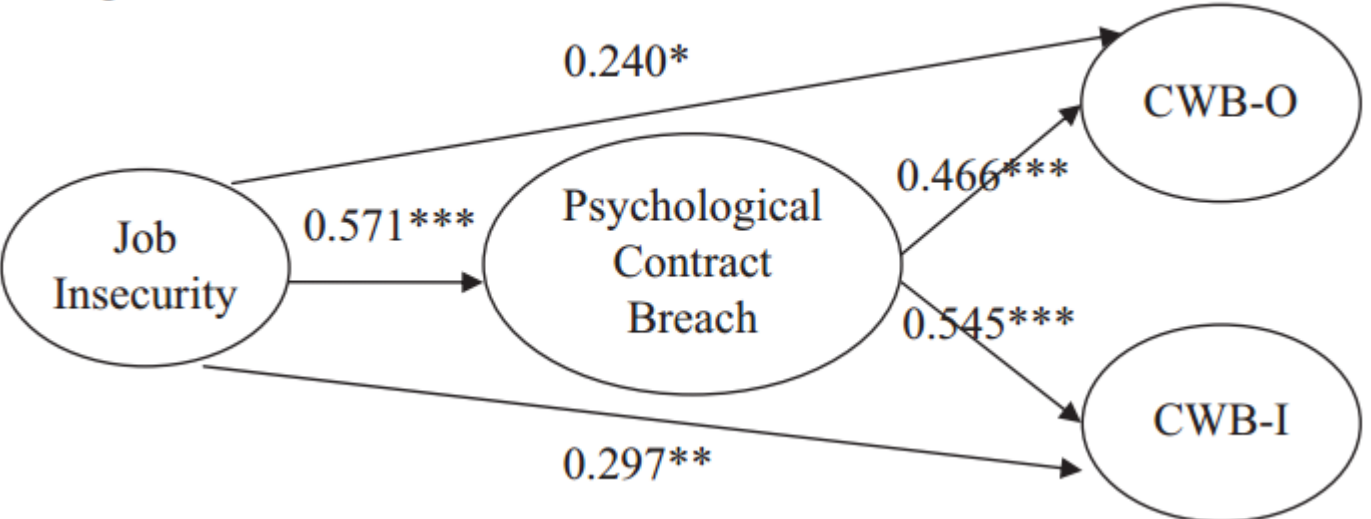
Estimated effects and 95% confidence intervals

We found that both indirect effects of job insecurity on CWB-O and CWB-I through psychological contract breach were significant, since the 95% confidence intervals did not include 0.

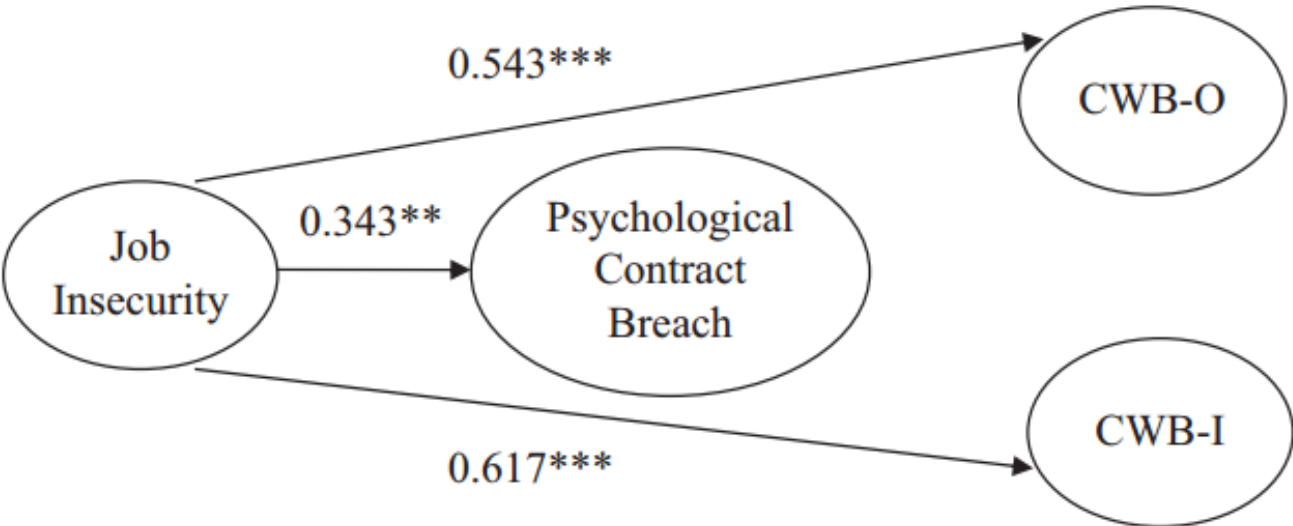


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For permanent workers:



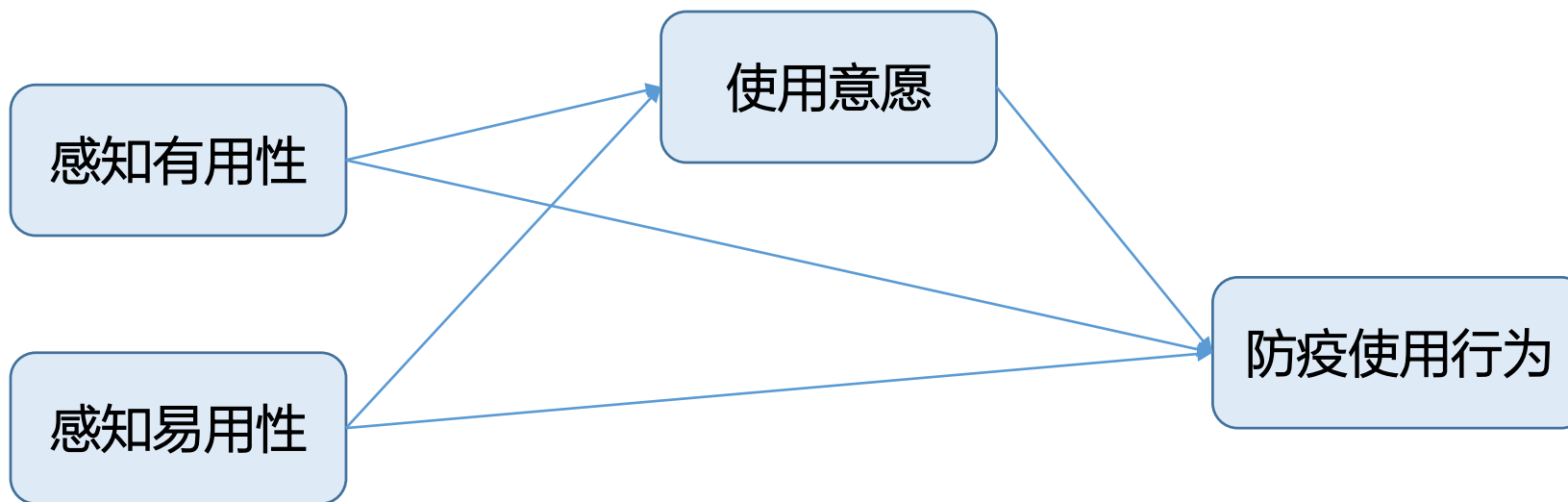
For contract workers:





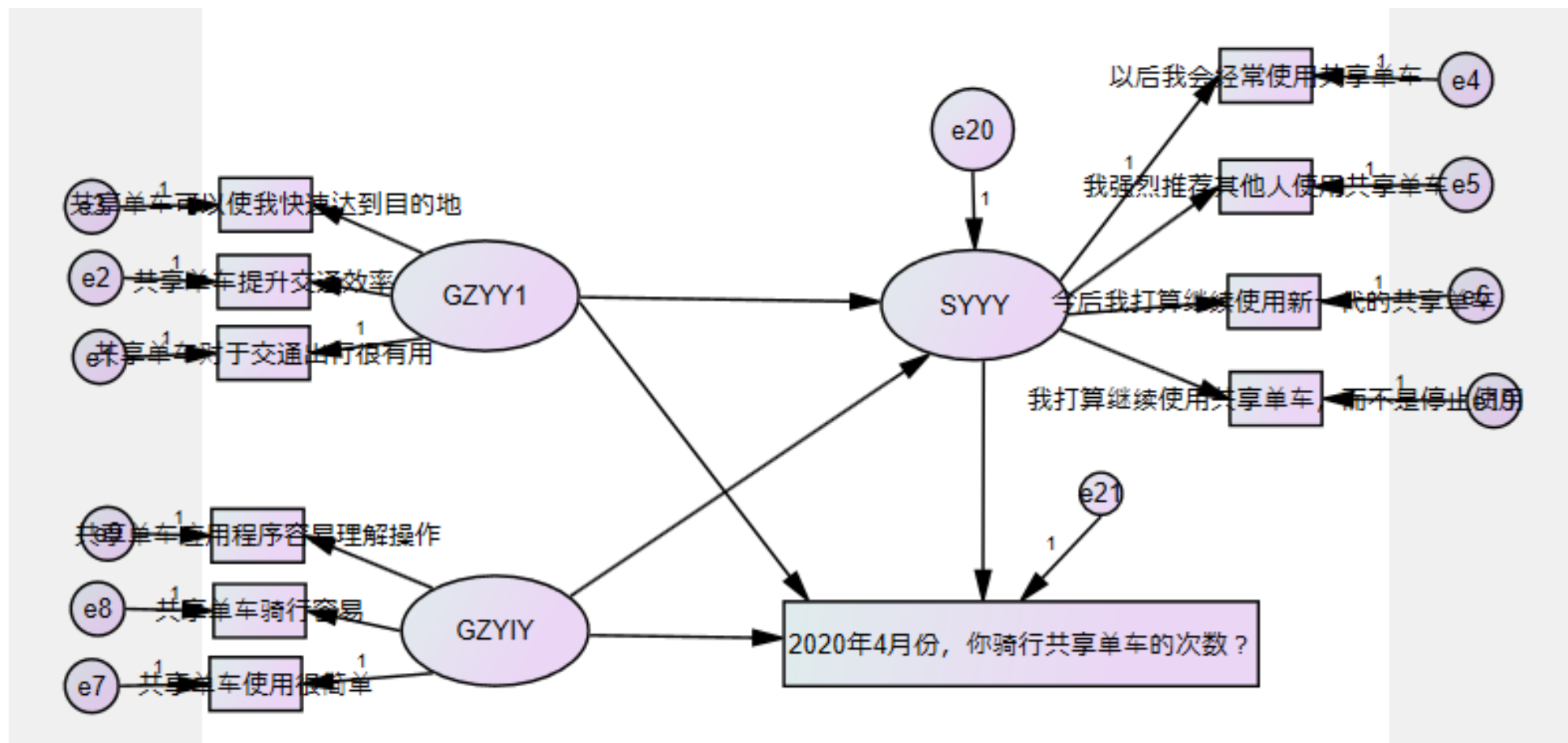
1 模型假设

共享单车防疫使用行为





1 模型假设



2 Bootstrap



Analysis Properties

Estimation | Numerical | Bias | Output | Bootstrap | Permutations | Random # | Title

- Minimization history
- Standardized estimates
- Squared multiple correlations
- Sample moments
- Implied moments
- All implied moments
- Residual moments
- Modification indices

- Indirect, direct & total effects
- Factor score weights
- Covariances of estimates
- Correlations of estimates
- Critical ratios for differences
- Tests for normality and outliers
- Observed information matrix
- 4 Threshold for modification indices

20201016-2 : Group number 1 : Input

File Edit View Diagram Analyze Tools Plugins Help

Analysis Properties

Estimation | Numerical | Bias | Output | Bootstrap | Permutations | Random # | Title

Group number 1

OK: Default model

Unstandardized estimate
Standardized estimates

- Perform bootstrap 2000 Number of bootstrap samples
- Percentile confidence intervals 90 PC confidence level
- Bias-corrected confidence intervals 90 BC confidence level
- Bootstrap ADF
- Bootstrap ML
- Bootstrap GLS
- Bootstrap SLS
- Bootstrap ULS
- Monte Carlo (parametric bootstrap)
- Report details of each bootstrap sample
- Bollen-Stine bootstrap
- 1 Bootfactor

9、您对

17、在以往通过网络渠道购买该品牌服装的过程中，您的总体购物体验满意程度如何？

20201016-2



3 Bootstrap

Amos Output

Standardized Indirect Effects (Group number 1 - Default model)

	GZYIY	GZYY1	SYYY
SYYY	.000	.000	.000
QX2	.113	.117	.000
Q27	.255	.264	.000
PEOU1	.000	.000	.000
PEOU2	.000	.000	.000
PEOU3	.000	.000	.000
Q25	.222	.230	.000
Q23	.192	.199	.000
Q22	.289	.299	<u>.000</u>
Q10	.000	.000	.000
Q12	.000	.000	.000
Q16	.000	.000	.000

Variable Summary
Parameter Summary
Notes for Model
Estimates
 Scalars
 Regression Weights:
 Standardized Regression Weights:
 Variances:
 Matrices
 Total Effects
 Standardized Total Effects
 Direct Effects
 Standardized Direct Effects
 Indirect Effects
 Standardized Indirect Effects
Modification Indices
Minimization History
Pairwise Parameter Comparisons
Summary of Bootstrap Iterations
Estimates/Bootstrap
 Estimates
 Bootstrap standard errors
 Bootstrap Confidence
 Bias-corrected percentile method
 Percentile method
 Lower Bounds (PC)
 Upper Bounds (PC)
 Two Tailed Significance (PC)

3 Bootstrap

第一步，点击

第二步，点击

第三步，点击

The screenshot shows the Amos Output window with the following structure:

- Variable Summary
- Parameter Summary
- Notes for Model
- Estimates
 - Scalars
 - Regression Weights:
 - Standardized Regression Weights:
 - Variances:
 - Matrices
 - Total Effects
 - Standardized Total Effects
 - Direct Effects
 - Standardized Direct Effects
 - Indirect Effects
 - Standardized Indirect Effects
 - Modification Indices
 - Minimization History
 - Pairwise Parameter Comparisons
 - Summary of Bootstrap Iterations
- Estimates/Bootstrap
 - Estimates
 - Bootstrap standard errors
 - Bootstrap Confidence
 - Bias-corrected percentile method
 - Percentile method
 - Lower Bounds (PC)
 - Upper Bounds (PC)
 - Two Tailed Significance (PC)

Group number 1

Default model

Standardized Indirect Effects (Group number 1 - Default model)

Standardized Indirect Effects - Lower Bounds (PC) (Group number 1 - Default model)

	GZYY1	GZYY1	SYYY
SYYY	.000	.000	.000
QX2	.046	.050	.000
Q27	.162	.172	.000
PEOU1	.000	.000	.000
PEOU2	.000	.000	.000
PEOU3	.000	.000	.000
Q25	.138	.151	.000
Q23	.122	.132	.000
Q22	.197	.198	.000
Q10	.000	.000	.000
Q12	.000	.000	.000
Q16	.000	.000	.000

Standardized Indirect Effects - Upper Bounds (PC) (Group number 1 - Default model)

	GZYY1	GZYY1	SYYY
SYYY	.000	.000	.000
QX2	.199	.203	.000
Q27	.350	.358	.000
PEOU1	.000	.000	.000
PEOU2	.000	.000	.000
PEOU3	.000	.000	.000
Q25	.306	.310	.000
Q23	.265	.269	.000
Q22	.365	.400	.000
...

當下限和上限所在的區間不包括0時，即表示顯著



谢谢