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## Measuring and Modelling the Reliability of the Transport Supply Experiments with Swiss Respondents

A König

Travel Survey Metadata Series

## Measuring and Modelling the Reliability of the Transport Supply Experiments with Swiss Respondents

A König  
IVT  
ETH Zürich  
Zürich

Phone: 01-633 39 52

Fax: 01-633 10 57

[koenig@ivt.baug.ethz.ch](mailto:koenig@ivt.baug.ethz.ch)

### Abstract

Current transport models focus mainly on the variables travel time and travel costs to explain choices made by travellers. In contrast to this, research results substantiate the influence of a range of additional explanatory variables. The reliability of the transportation system is one important example. The inclusion of those variables into the forecasting of the traveller decision requires more knowledge about their valuations. In this context this study pursues various aims: First, to compare the influence of the reliability of travel times with variables normally included; to confirm the plausibility of the available empirical results; to describe the impact of variables representing the reliability; to recommend an appropriate implementation into discrete choice models; finally reliability should be valued monetarily and a recommendation has to be given for its inclusion the cost-benefit-analysis. This study gives an overview of the state of the art and recent empirical work the valuation of travel time and reliability. Following the design, the structure and the performance of two stated preference (SP) surveys are explained. Within these case studies different approaches of presenting reliability are applied. The used SP-experiments employ route choice, mode choice and departure time choice stated preference. This first part concludes with a descriptive analysis of the sample. The second part contexts develops discrete choice models for each of the choice experiments. The estimations start with basic models which will be expanded and finish with a recommended model for each type of experiment. The choice analysis allows the estimation of a value of travel time savings and a value of reliability. The results of the study show that travellers value the increase travel time reliability and the saving of travel time equally. This substantiates the importance of considering both those variables in choice models. The reliability can be implemented in each choice context, route choice, mode choice and departure time choice. The highest goodness of fit is observed for the route choice models. It is recommended that the reliability of travel times on routes should be defined as the maximum delay and also as the probability of this duration. The linear formulation of these variables in the utility function leads to the highest precision. In contrast to experiences earlier studies models with mean travel time or mean delay and their variance do not raise the model fitness. Further it is recommended that the willingness to pay for reliable travel times should be calculated by a model formulation which includes reliability with an interaction form between the maximum delay and the elasticity of the lateness probability. The estimation process brings up an equation that can be used in cost-benefit-analysis to calculate a monetary value for different reliabilities by a change of supply. The willingness to pay for a 50% reduction of the

lateness probability per minute of a delay is estimated 0.28 CHF for car drivers and 0.12 CHF for PT users. The willingness to pay for a complete cut of lateness is about 30% higher than the estimated value of travel time savings. The Estimation shows no significant difference of the reliability valuation between market segments like trip purposes or distances. The chosen approach does not allow calculating the willingness to pay for the reduction of earlier arrivals For this topic further work has to be done.

### **Keywords**

Reliability, Lateness, Value of reliability, Discrete choice analysis, Doctoral Dissertation, Institute for Transport Planning and Systems (IVT), Swiss Federal Institute of Technology

### **Preferred citation style**

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# 1.0 Document Description

## Citation

Title: Measuring and Modelling the Reliability of the Transport Supply  
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## 2.0 Study Description

### Citation

Title:	Measuring and Modelling the Reliability of the Transport Supply Experiments with Swiss Respondents
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## Study Scope

**Keywords:** Reliability, Lateness, Value of reliability, Discrete choice analysis, Doctoral Dissertation, Insti-tute for Transport Planning and Systems (IVT), Swiss Federal Institute of Technology

**Abstract:** Current transport models focus mainly on the variables travel time and travel costs to explain choices made by travellers. In contrast to this, research results substantiate the influence of a range of additional explanatory variables. The reliability of the transportation system is one important example. The inclusion of those variables into the forecasting of the traveller decision requires more knowledge about their valuations. In this context this study pursues various aims: First, to compare the influence of the reliability of travel times with variables normally included; to confirm the plausibility of the available empirical results; to describe the impact of variables representing the reliability; to recommend an appropriate implementation into discrete choice models; finally reliability should be valued monetarily and a recommendation has to be given for its inclusion the cost-benefit-analysis. This study gives an overview of the state of the art and recent empirical work the valuation of travel time and reliability. Following the design, the structure and the performance of two stated preference (SP) surveys are explained. Within these case studies different approaches of presenting reliability are applied. The used SP-experiments employ route choice, mode choice and departure time choice stated preference. This first part concludes with a descriptive analysis of the sample. The second part contexts develops discrete choice models for each of the choice experiments. The estimations start with basic models which will be expanded and finish with a recommended model for each type of experiment. The choice analysis allows the estimation of a value of travel time savings and a value of reliability. The results of the study show that travellers value the increase travel time reliability and the saving of travel time equally. This substantiates the importance of considering both those variables in choice models. The reliability can be implemented in each choice context, route choice, mode choice and departure time choice. The highest goodness of fit is observed for the route choice models. It is recommended that the reliability of travel times on routes should be defined as the maximum delay and also as the probability of this duration. The linear formulation of these variables in the utility function leads to the highest precision. In contrast to experiences earlier studies models with mean travel time or mean delay and their variance do not raise the model fitness. Further it is recommended that the willingness to pay for reliable travel times should be calculated by a model formulation which includes reliability with an interaction form between the maximum delay and the elasticity of the lateness probability. The estimation process brings up an equation that can be used in cost-benefit-

analysis to calculate a monetary value for different reliabilities by a change of supply. The willingness to pay for a 50% reduction of the lateness probability per minute of a delay is estimated 0.28 CHF for car drivers and 0.12 CHF for PT users. The willingness to pay for a complete cut of lateness is about 30% higher than the estimated value of travel time savings. The Estimation shows no significant difference of the reliability valuation between market segments like trip purposes or distances. The chosen approach does not allow calculating the willingness to pay for the reduction of earlier arrivals For this topic further work has to be done.

Country:	Switzerland
Geographic Coverage:	Switzerland
Unit of Analysis:	Person
Universe:	Permanant residents of Switzerland

## **Methodology and Processing**

Time Method:            Cros-sectional survey conducted in two phases

Sampling  
Procedure:            Random sampling

Mode of Data  
Collection:            Self-administrative mail back questionnaire

## **Sources Statement**

Weighting:            None

## **Other Study Description Materials**

### **Related Studies**

#### **Citation**

Title: Verlässlichkeit als Entscheidungsvariable

### **Related Publications**

#### **Citation**

Title: König, A. und K.W. Axhausen (2003) Verlässlichkeit als Entscheidungsvariable: Vorstudie, Forschungsauftrag SVI 44/00, Schriftenreihe, 1039, Bundesamt für Strassen, Bern.

Holdings Information: <http://www.ivt.baug.ethz.ch/ab110.pdf>

## **3.0 File Description**

### **File: Reliability.NSDstat**

- Number of cases: 12230
- No. of variables per record: 75
- Type of File: NSDstat 200203

## 4.0 Variable Description

### Variable Groups

- [ID](#)
- [Socio demographic](#)
- [Question 3](#)
- [Question 41](#)
- [Question 42](#)
- [Question 5](#)
- [Question 6](#)

#### ID

Variables within *ID*

- [Number of question](#)
- [Number of survey](#)
- [Person number](#)
- [Car chosen by the reported trip in the SBB-telephone interview](#)
- [PT chosen by the reported trip in the SBB-telephone interview](#)
- [Chosen alternative \[-\]](#)

#### Socio demographic

Variables within *Socio demographic*

- [Person number](#)
- [Language of respondent](#)
- [Number of vehicles in household](#)
- [Vehicle availability](#)
- [Age of respondent](#)
- [Gender](#)
- [Working status](#)
- [Number of household members adults](#)
- [Number of household members children](#)
- [Number of ga tickets in hh](#)
- [Number of discount tickets in hh](#)
- [Number of season tickets in hh](#)
- [Number of line tickets in hh](#)
- [Household income brutto \[chf/year\] mean of classes](#)
- [Working status](#)

#### Question 3

Variables within *Question 3*

- [Number of question](#)
- [Number of days with cogestion per week](#)
- [Duration of congestion \[min\]](#)
- [Additional tax/cost \[CHF\]](#)

**Question 41**Variables within *Question 41*

- [Number of question](#)
- [Number of survey](#)
- [Mean congestion per day/trip \[min\]](#)
- [Mean duration of congestion per day/trip \[min\]](#)
- [Std congestion per day/trip \[min\]](#)
- [Std duration of congestion per day/trip \[min\]](#)
- [Trip duration PT \[min\]](#)
- [Trip duration Car \[min\]](#)
- [Punctuality \[%\]](#)
- [Mean travel time alternative pt and car long \[min\]](#)
- [Mean travel time alternative car short and unreliable \[min\]](#)
- [Mean punctuality](#)
- [Std travel time alternative pt and car long \[min\]](#)
- [Std travel time alternative car short and unreliable \[min\]](#)
- [Std punctuality](#)

**Question 42**Variables within *Question 42*

- [Number of survey](#)
- [Person number](#)
- [Travel time alternative a \[min\]](#)
- [Travel time alternative b uncongested \[min\]](#)
- [Travel time alternative b congested \[min\]](#)
- [Mean travel time alternative a \[min\]](#)
- [Mean travel time alternative b uncongested \[min\]](#)
- [Mean travel time alternative a congested \[min\]](#)
- [Std travel time alternative a \[min\]](#)
- [Std travel time alternative b uncongested \[min\]](#)
- [Std travel time alternative a congested \[min\]](#)

**Question 5**Variables within *Question 5*

- [Language of respondent](#)
- [Number of vehicles in household](#)

- Vehicle availability
- Arrival time alternative a [min from midnight]
- SDE alternative a [min]
- SDL alternative a [min]
- Probability of early arrival alternative a [%]
- Probability of punctual arrival alternative a [%]
- Probability of late arrival alternative a [%]
- Travel time alternative b [min]
- Arrival time alternative b [min from midnight]
- SDE alternative b [min]
- SDL alternative b [min]
- Probability of early arrival alternative b [%]
- Probability of punctual arrival alternative b [%]
- Probability of late arrival alternative b [%]
- Buffering time alternative a [min]
- Buffering time alternative b [min]
- Purpose commute
- Purpose doctor
- Purpose leisure

## Question 6

### Variables within *Question 6*

- Vehicle availability
- Age of respondent
- Probability of delay
- Travel time uncongested alternative a [min]
- Purpose business
- Purpose leisure
- Mean travel time uncongested alternative a [min]
- Mean congestion duration alternative a [min]
- Mean probability of delay alternative a
- Mean travel time alternative b [min]
- Std travel time uncongested alternative a [min]
- Std congestion duration alternative a [min]
- Std probability of delay alternative a
- Std travel time alternative b [min]

## **Variables**

***Variable: Number of question***

Location:	Value	Label	Frequency
Width: 11	2 .	Question 3 (route choice with road pricing/supplement)	4999
	3 .	Question 41 (mode choice)	1251
	4 .	Question 42 (route choice with pic)	2186
	5 .	Question 5 (departure time choice)	816
	6 .	Question 6 (mode choice with rail tunnel fee)	2978

*Range of Valid Data Values: 2 to 6*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of survey***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	1 .	Study 1	8436
	2 .	Study 2	3794

*Range of Valid Data Values: 1 to 2*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Person number***

Location:                    *Range of Valid Data Values: 3 to 18652*

Width: 11                    **Summary Statistics:**

*Minimum : 3*

*Maximum : 18652*

*Variable Format: numeric*

***Variable: Language of respondent***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	Missing	3794
	1 .	German	6866
	2 .	French	1570

*Range of Valid Data Values: 0 to 2*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of vehicles in household***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	None	944
	1 .	One	6886
	2 .	Two	3578
	3 .	Three	700
	4 .	Four	90
	5 .	Five	32

*Range of Valid Data Values: 0 to 5*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Vehicle availability***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	No	6199
	1 .	Yes	6031

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Age of respondent***

Location:	Value	Label	Frequency
Width: 11	15 .		107
	16 .		178
	17 .		78
	18 .		151
	19 .		97
	20 .		124
	21 .		87
	22 .		128
	23 .		93
	24 .		64
	25 .		57
	26 .		85
	27 .		150
	28 .		123
	29 .		144
	30 .		155
	31 .		202
	32 .		247
	33 .		272
	34 .		220
	35 .		323
	36 .		372
	37 .		384
	38 .		361
	39 .		276
	40 .		472
	41 .		345
	42 .		393
	43 .		369

44 .	188
45 .	368
46 .	219
47 .	191
48 .	229
49 .	211
50 .	363
51 .	208
52 .	213
53 .	288
54 .	202
55 .	368
56 .	196
57 .	189
58 .	276
59 .	143
60 .	263
61 .	166
62 .	167
63 .	130
64 .	193
65 .	311
66 .	202
67 .	164
68 .	66
69 .	158
70 .	257
71 .	39
72 .	16
73 .	39
74 .	24

75 .	27
76 .	32
77 .	16
78 .	26
80 .	24
81 .	1

*Range of Valid Data Values: 15 to 81*

**Summary Statistics:**

*Minimum : 15*

*Maximum : 81*

*Mean : 45.064*

*Standard deviation : 14.4*

*Variable Format: numeric*

***Variable: Gender***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	Female	5789
	1 .	Male	6441

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Working status***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	Missing	1250
	1 .	Pupil	1332
	2 .	Student	1599
	3 .	Apprentence	409
	4 .	Housemaker	1169
	5 .	Retiree	863
	6 .	Unemployed	33
	7 .	Parttime	1453
	8 .	Fulltime	3390
	9 .	Selfemployed	732

*Range of Valid Data Values: 0 to 9*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Car chosen by the reported trip in the SBB-telephone interview***

Location:	Value	Label	Frequency
Width: 11	0 .	No	8226
	1 .	Yes	4004

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: PT chosen by the reported trip in the SBB-telephone interview***

Location:	Value	Label	Frequency
Width: 11	0 .	No	8233
	1 .	Yes	3997

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of days with cogestion per week***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	None	7231
	1 .	One	1697
	2 .	Two	2204
	3 .	Three	1098

*Range of Valid Data Values: 0 to 3*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Duration of congestion [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		4253
	15 .		1684
	30 .		2750
	40 .		1129
	45 .		1670
	50 .		744

*Range of Valid Data Values: 0 to 50*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Additional tax/cost [CHF]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		4253
	10 .		2438
	15 .		630
	20 .		474
	25 .		499
	30 .		2315
	50 .		1621

*Range of Valid Data Values: 0 to 50*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Chosen alternative [-]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	1 .		5957
	2 .		5022
	3 .		506
	4 .		553
	5 .		192

*Range of Valid Data Values: 1 to 5*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Mean congestion per day/trip [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		7231
	1 .		6
	1.25 .		4
	1.4 .		20
	1.5 .		10
	1.6 .		20
	1.67 .		1632
	1.75 .		24
	1.8 .		95
	2 .		3168
	2.2 .		20

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean duration of congestion per day/trip [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		7231
	22.5 .		6
	25 .		9
	26.3 .		40
	27 .		90
	27.5 .		1566
	30 .		1629
	32.5 .		1626
	33 .		15
	33.8 .		4
	36 .		10
	37.5 .		4

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std congestion per day/trip [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		7245
	0.447 .		15
	0.5 .		8
	0.548 .		20
	0.577 .		10
	0.632 .		1548
	0.707 .		22
	0.816 .		1634
	0.837 .		100
	0.894 .		1586
	0.957 .		20
	1 .		20
	1.414 .		2

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std duration of congestion per day/trip [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		7231
	10.61 .		15
	11.29 .		1566
	12.25 .		4
	12.55 .		95
	13.42 .		1558
	14.36 .		44
	14.75 .		1626
	15 .		68
	16.43 .		10
	17.32 .		13

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Trip duration PT [min]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		10979
	60 .		499
	90 .		483
	120 .		269

*Range of Valid Data Values: 0 to 120*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Trip duration Car [min]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		10979
	15 .		509
	30 .		490
	45 .		252

*Range of Valid Data Values: 0 to 45*

**Summary Statistics:**

*Variable Format: numeric*

**Variable: Punctuality [%]**

Location: *Range of Valid Data Values: 0 to 70*

Width: 11 **Summary Statistics:**

*Minimum : 0*

*Maximum : 70*

*Mean : 5.525*

*Standard deviation : 15.877*

*Variable Format: numeric*

***Variable: Mean travel time alternative pt and car long [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	75 .		4
	78 .		450
	80 .		3
	82.5 .		8
	84 .		240
	90 .		534
	97.5 .		12

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean travel time alternative car short and unreliable [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	18.75 .		4
	21 .		240
	22.5 .		4
	24 .		295
	26.25 .		4
	27 .		450
	30 .		3
	33.75 .		4
	36 .		235
	37.5 .		12

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean punctuality***

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	40 .		12
	42 .		220
	44 .		235
	46 .		240
	47.5 .		8
	56.67 .		3
	58 .		230
	60 .		299
	65 .		4

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time alternative pt and car long [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	16.43 .		450
	17.32 .		7
	24.49 .		4
	25.1 .		240
	28.72 .		20
	30 .		530

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time alternative car short and unreliable [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	7.5 .		8
	8.216 .		475
	8.66 .		16
	12.55 .		450
	13.42 .		295
	14.36 .		4
	15 .		3

**Summary Statistics:**

*Variable Format:* numeric

**Variable: Std punctuality**

Location:	Value	Label	Frequency
Width: 11	0 .		10979
	8.165 .		8
	8.367 .		230
	10 .		4
	11.55 .		3
	13.04 .		220
	14.14 .		303
	15 .		8
	15.17 .		475

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Travel time alternative a [min]***

Location:                    *Range of Valid Data Values: 0 to 120*

Width: 11                    **Summary Statistics:**

*Minimum : 0*

*Maximum : 120*

*Mean : 34.401*

*Standard deviation : 40.707*

*Variable Format: numeric*

***Variable: Travel time alternative b uncongested [min]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		10044
	25 .		720
	35 .		739
	45 .		727

*Range of Valid Data Values: 0 to 45*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Travel time alternative b congested [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	30 .		739
	40 .		754
	50 .		693

*Range of Valid Data Values: 0 to 50*

**Summary Statistics:**

*Variable Format: numeric*

**Variable: Mean travel time alternative a [min]**

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	42.5 .		4
	45 .		4
	46 .		460
	46.67 .		3
	47.5 .		12
	48 .		440
	50 .		233
	52 .		540
	52.5 .		8
	54 .		470
	55 .		12

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean travel time alternative b uncongested [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	30 .		4
	32.5 .		12
	33 .		930
	35 .		481
	37 .		530
	39 .		225
	40 .		4

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean travel time alternative a congested [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	35 .		8
	36 .		285
	37.5 .		20
	38 .		500
	40 .		717
	42 .		430
	42.5 .		4
	44 .		215
	45 .		4
	46.67 .		3

**Summary Statistics:**

*Variable Format:* numeric

**Variable: Std travel time alternative a [min]**

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	5 .		12
	5.477 .		490
	5.774 .		4
	7.071 .		225
	8.367 .		490
	8.944 .		440
	9.574 .		12
	10 .		12
	10.95 .		490
	11.55 .		11

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time alternative b uncongested [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	5.774 .		8
	8.165 .		24
	8.367 .		1460
	8.944 .		225
	9.574 .		12
	10 .		453
	11.55 .		4

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time alternative a congested [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		10044
	5 .		4
	5.477 .		285
	5.774 .		11
	7.071 .		225
	8.165 .		12
	8.367 .		725
	8.944 .		215
	9.574 .		20
	10 .		484
	10.95 .		205

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Number of household members adults***

Location:	Value	Label	Frequency
Width: 11	0 .		8436
	1 .		574
	2 .		2506
	3 .		374
	4 .		216
	5 .		116
	8 .		8

*Range of Valid Data Values: 0 to 8*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of household members children***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		10908
	1 .		346
	2 .		664
	3 .		248
	4 .		40
	5 .		24

*Range of Valid Data Values: 0 to 5*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of ga tickets in hh***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11697
	1 .		256
	2 .		185
	3 .		48
	4 .		44

*Range of Valid Data Values: 0 to 4*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of discount tickets in hh***

Location:	Value	Label	Frequency
Width: 11	0 .		9640
	1 .		959
	2 .		1432
	3 .		151
	4 .		48

*Range of Valid Data Values: 0 to 4*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of season tickets in hh***

Location:	Value	Label	Frequency
Width: 11	0 .		11758
	1 .		320
	2 .		104
	3 .		48

*Range of Valid Data Values: 0 to 3*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Number of line tickets in hh***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11407
	1 .		567
	2 .		224
	3 .		8
	4 .		24

*Range of Valid Data Values: 0 to 4*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Household income brutto [chf/year] mean of classes***

Location:	Value	Label	Frequency
Width: 11	0 .		8436
	10000 .		32
	13750 .		1
	30000 .		221
	50000 .		574
	70000 .		1089
	90000 .		783
	112500 .		465
	137500 .		210
	162500 .		336
	167500 .		83

*Range of Valid Data Values: 0 to 167500*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Working status***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .	missing	8436
	1 .	Pupil	0
	2 .	student	60
	3 .	Apprentence	0
	4 .	Housemaker	443
	5 .	Retiree	684
	6 .	Unemployed	24
	7 .	Parttime	672
	8 .	Fulltime	1599
	9 .	Selfemployed	312

*Range of Valid Data Values: 0 to 9*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Arrival time alternative a [min from midnight]***

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	420 .		45
	450 .		76
	480 .		25
	510 .		51
	540 .		34
	990 .		81
	1020 .		107
	1050 .		40
	1080 .		64
	1110 .		97
	1140 .		80
	1170 .		29
	1200 .		54
	1230 .		33

*Range of Valid Data Values: 0 to 1230*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: SDE alternative a [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	1 .		46
	2 .		144
	3 .		226
	4 .		121
	5 .		138
	6 .		55
	7 .		42
	8 .		22
	9 .		6
	10 .		10
	11 .		3
	12 .		2
	15 .		1

*Range of Valid Data Values: 0 to 15*

**Summary Statistics:**

*Variable Format: numeric*

**Variable: SDL alternative a [min]**

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	1 .		36
	2 .		141
	3 .		148
	4 .		85
	5 .		68
	6 .		52
	7 .		87
	8 .		56
	9 .		30
	10 .		44
	11 .		27
	12 .		18
	13 .		3
	14 .		14
	15 .		4
	18 .		2
	23 .		1

*Range of Valid Data Values: 0 to 23*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of early arrival alternative a [%]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11414
	10 .		263
	20 .		285
	30 .		268

*Range of Valid Data Values: 0 to 30*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of punctual arrival alternative a [%]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11414
	10 .		441
	20 .		235
	30 .		140

*Range of Valid Data Values: 0 to 30*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of late arrival alternative a [%]***

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	50 .		170
	60 .		308
	70 .		210
	80 .		128

*Range of Valid Data Values: 0 to 80*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Travel time alternative b [min]***

Location:                    *Range of Valid Data Values: 0 to 90*

Width: 11                    **Summary Statistics:**

*Minimum : 0*

*Maximum : 90*

*Mean : 19.032*

*Standard deviation : 30.653*

*Variable Format: numeric*

***Variable: Arrival time alternative b [min from midnight]***

Location:                    *Range of Valid Data Values: 0 to 1230*

Width: 11                    **Summary Statistics:**

*Minimum : 0*

*Maximum : 1230*

*Mean : 60.306*

*Standard deviation : 237.613*

*Variable Format: numeric*

**Variable: SDE alternative b [min]**

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	1 .		44
	2 .		110
	3 .		205
	4 .		126
	5 .		158
	6 .		58
	7 .		59
	8 .		26
	9 .		8
	10 .		12
	11 .		4
	12 .		4
	15 .		2

*Range of Valid Data Values: 0 to 15*

**Summary Statistics:**

*Variable Format: numeric*

**Variable: SDL alternative b [min]**

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	1 .		37
	2 .		137
	3 .		151
	4 .		98
	5 .		88
	6 .		59
	7 .		75
	8 .		57
	9 .		26
	10 .		42
	11 .		16
	12 .		13
	13 .		1
	14 .		8
	15 .		2
	18 .		4
	23 .		2

*Range of Valid Data Values: 0 to 23*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of early arrival alternative b [%]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11414
	10 .		402
	20 .		202
	30 .		212

*Range of Valid Data Values: 0 to 30*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of punctual arrival alternative b [%]***

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	10 .		247
	20 .		231
	30 .		338

*Range of Valid Data Values: 0 to 30*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of late arrival alternative b [%]***

Location:	Value	Label	Frequency
Width: 11	0 .		11414
	40 .		144
	50 .		92
	60 .		234
	70 .		213
	80 .		133

*Range of Valid Data Values: 0 to 80*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Buffering time alternative a [min]***

Location:                    *Range of Valid Data Values: 0 to 80*

Width: 11                    **Summary Statistics:**

*Minimum : 0*

*Maximum : 80*

*Mean : 0.879*

*Standard deviation : 4.109*

*Variable Format: numeric*

***Variable: Buffering time alternative b [min]***

Location: *Range of Valid Data Values: 0 to 85*

Width: 11 **Summary Statistics:**

*Minimum : 0*

*Maximum : 85*

*Mean : 0.876*

*Standard deviation : 4.139*

*Variable Format: numeric*

***Variable: Purpose commute***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		10728
	1 .		1502

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Purpose doctor***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11894
	1 .		336

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Purpose leisure***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11981
	1 .		249

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Probability of delay***

Location:	Value	Label	Frequency
Width: 11	0 .		9252
	30 .		1224
	40 .		511
	50 .		607
	60 .		636

*Range of Valid Data Values: 0 to 60*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Travel time uncongested alternative a [min]***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		9252
	50 .		1132
	60 .		1221
	70 .		625

*Range of Valid Data Values: 0 to 70*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Purpose business***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11708
	1 .		522

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Purpose leisure***

Location:	<b>Value</b>	<b>Label</b>	<b>Frequency</b>
Width: 11	0 .		11045
	1 .		1185

*Range of Valid Data Values: 0 to 1*

**Summary Statistics:**

*Variable Format: numeric*

***Variable: Mean travel time uncongested alternative a [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		9252
	52.857142857143 .		7
	55 .		1018
	55.714285714286 .		7
	56.666666666667 .		3
	58.75 .		928
	61.25 .		1008
	61.428571428571 .		7

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean congestion duration alternative a [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		9252
	30 .		2
	33.3333333333333 .		3
	35.714285714286 .		7
	36.25 .		1008
	37.5 .		928
	41.428571428571 .		14
	42.5 .		1016

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean probability of delay alternative a***

Location:	Value	Label	Frequency
Width: 11	0 .		9252
	37.5 .		928
	38.571428571429 .		7
	38.75 .		1016
	40 .		9
	43.333333333333 .		3
	48.571428571429 .		7
	50 .		1008

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Mean travel time alternative b [min]***

Location:	Value	Label	Frequency
Width: 11	0 .		9252
	60 .		5
	67.5 .		928
	69.375 .		1016
	70.714285714286 .		14
	75 .		1008
	77.142857142857 .		7

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time uncongested alternative a [min]***

Location:	Value	Label	Frequency
Width: 13	0 .		9252
	4.8795003647427 .		7
	5.7735026918963 .		3
	6.4086994446166 .		928
	7.0710678118655 .		2
	7.5592894601845 .		1016
	7.8679579246944 .		7
	8.3452296039628 .		1008
	8.9973541084244 .		7

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std congestion duration alternative a [min]***

Location:	Value	Label	Frequency
Width: 13	0 .		9254
	5.7735026918963 .		3
	6.9006555934235 .		14
	7.0710678118655 .		1016
	7.4402380914284 .		1008
	7.8679579246944 .		7
	8.8640526042792 .		928

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std probability of delay alternative a***

Location:	Value	Label	Frequency
Width: 13	0 .		9252
	10.350983390135 .		928
	11.259916264596 .		1016
	11.547005383793 .		10
	11.952286093344 .		1008
	12.149857925879 .		14
	14.142135623731 .		2

**Summary Statistics:**

*Variable Format:* numeric

***Variable: Std travel time alternative b [min]***

Location:	Value	Label	Frequency
Width: 13	0 .		9257
	8.0178372573727 .		928
	10.350983390135 .		7
	11.160357137143 .		1016
	11.338934190277 .		1022

**Summary Statistics:**

*Variable Format:* numeric