Airline itinerary Case

These data come from an Internet choice survey conducted by the Boeing Company in the Fall of 2004. Boeing was interested in understanding the sensitivity that air passengers have toward the attributes of an airline itinerary, such as fare, travel time, transfers, legroom, and aircraft. It was executed on a sample of the customers of an Internet airline booking service. The Internet service takes a specific user request for travel in a city pair and interrogates the web sites of airlines that provide service in that market, returning to the user a compiled list of available itineraries. While that interrogation is taking place, randomly selected customers were recruited to be surveyed.

A typical page of the survey instrument is shown in Figure 1. The respondent was offered three choices based on the origin-destination market request that the respondent entered into the itinerary search engine. The first alternative is always a non-stop flight, the second always a flight with 1 stop on the same airline, and the third is always a flight with 1 stop and a change of airline. The respondent was asked to rank the available choices as well as given the option to decline all of the stated options. Demographic data collected included age, gender, income, occupation, and education. Situational variables that were identified included: a) the desired departure time; b) trip purpose; c) who is paying for the trip; and d) the number in the travel party. All trips were for origin-destination city pairs in the United States.

There are 1633 respondents, each providing 1 SP response. Descriptions of the available variables are reported in Tables 1 to 4 and some descriptive statistics are given in Tables 5 and 6.

Figure 1: Example of Survey Instrument

Variable	Description
SubjectId	Unique identifier for each respondent.
q17_Gender	1 if male, 2 if female, 99 or -1 if missing.
q15_Age	Age, (1 = Less than 18 years, 2 = 18-24 years, 3= 25-34 years, 3.5 = 25-44 years, 4 = 35-44 years, 5 = 45-54 years, 6 = 55-64 years, 7 = 65-74 years, 8 = 75 years or older, 99 or -1 if missing)
q19_Occupation	Occupation (01 = Executive and Managerial, 02 = Professional, 03 = Technicians and related support, 04 = Sales, 05 = Administrative support, 06 = Services, 07 = Precision production, craft, repair, 08 = Machine operators, assemblers, inspectors, 09 = Transportation and material moving, 10 = Handlers, cleaners, helpers, 11 = Farming, forestry, and fishing, 12 = Armed forces, 99 or -1 if missing)
q16_Income	Annual income in 100$; -1 or 99 if income information is missing
q20_Education	Education (01 = Less than High School Diploma, 02 = High School Graduate, 03 = Some college, No Degree, 04 = Associate Degree - Occupational, 05 = Associate Degree - Academic, 06 = Bachelors Degree, 07 = Masters Degree, 08 = Professional Degree, 09 = Doctorate Degree, 99 or -1 if missing)
q11_DepartureOrArrivalIsImportant	Importance of punctuality of departure or arrival (1 = departure is important; 2= arrival is important; otherwise, not important)

Table 1: Description of Respondent Specific Variables

Variable	Description
BestAlternative_X	The chosen alternative is X

Table 2: Description of Survey Responses

Variable	Description
q02_TripPurpose	Trip purpose (1=business, 2=leisure, 3=attending conference/seminar/training, 4=both business and leisure, 0=trip purpose missing)
q03_WhoPays	1 if the traveler is paying for the trip, 2 if it is his employer, 3 if it is a third party, 0 if missing
q12_IdealDepTime	Respondents ideal departure time (hours after midnight), -1 indicates a missing value
q14_PartySize	Number of persons traveling, -1 and 99 indicate missing values
OriginGMT	Origin city time zone (minutes from GMT (Greenwich Mean Time))
DestinationGMT	Destination city time zone (minutes from GMT)
Direction	Direction of itinerary (1=East to West, 2=West to East, 3=North-South, 0=missing)

Table 3: Description of Trip Specific Attributes

Variable	Description
DepartureTimeHours_X	Option X: Departure time, local (hours after midnight)
ArrivalTimeHours_X	Option X: Arrival time, local (hours after midnight)
FlyingTimeHours_X	Option X: Total time in air (hours)
TripTimeHours_X	Option X: Total trip time (hours)
Legroom_X	Option X: Legroom , 1 = 2 inches less than typical, 2 = typical, 3 = 2 inches more than typical, 4 = 4 inches more than typical
AirlineFirstFlight_X	Option X: Airline for first leg (only known to arbitrary airline number for proprietary reasons)
AirlineSecondFlight_X	Option X: Airline for second leg (if there exists a second leg) (only known to arbitrary airline number for proprietary reasons)
AirplaneFirstFlight_X	Option X: Airplane for first leg (only known to arbitrary airplane number for proprietary reasons)
AirplaneSecondFlight_X	Option X: Airplane for second leg (if there exists a second leg) (only known to arbitrary airplane number for proprietary reasons)
Fare_X	Option X: Fare ($)

Table 4: Description of Alternative Specific Attributes where X Corresponds to Choice Option (1),(2) and (3)

Variable	Average	St. Dev.	Min	Max
SubjectId	1807.50	1043.41	1.00	3613.00
q17_Gender	1.46	0.50	1.00	2.00
q15_Age	3.95	1.15	1.00	8.00
q19_Occupation	2.54	1.90	1.00	12.00
q16_Income	8.09	3.53	1.00	14.00
q20_Education	5.88	1.71	1.00	9.00
q02_TripPurpose	2.04	0.76	1.00	4.00
q03_WhoPays	1.20	0.46	1.00	3.00
q14_PartySize	1.70	0.99	1.00	5.00
OriginGMT	382.18	82.08	300.00	480.00
DestinationGMT	397.34	82.87	300.00	480.00
Direction	1.59	0.49	1.00	2.00
BestAlternative_1	0.69	0.46	0.00	1.00
BestAlternative_2	0.16	0.37	0.00	1.00
DepartureTimeHours_1	11.72	3.34	6.00	18.00
ArrivalTimeHours_1	15.21	3.35	7.67	21.63
FlyingTimeHours_1	3.74	1.59	0.67	6.35
TripTimeHours_1	3.74	1.59	0.67	6.35
Legroom_1	2.46	1.12	1.00	4.00
AirlineFirstFlight_1	4.61	2.56	1.00	11.00
AirlineSecondFlight_1	0.00	0.00	0.00	0.00
AirplaneFirstFlight_1	4.52	2.30	1.00	8.00
AirplaneSecondFlight_1	0.00	0.00	0.00	0.00
Fare_1	405.66	199.87	80.00	1330.00

Table 5: Descriptive Statistics of Variables

Variable	Average	St. Dev.	Min	Max
DepartureTimeHours_2	11.67	3.35	6.00	18.00
ArrivalTimeHours_2	16.92	3.36	9.17	24.10
FlyingTimeHours_2	4.24	1.59	1.17	6.85
TripTimeHours_2	5.50	1.68	1.83	8.85
Legroom_2	2.48	1.13	1.00	4.00
AirlineFirstFlight_2	4.68	2.65	1.00	11.00
AirlineSecondFlight_2	0.00	0.00	0.00	0.00
AirplaneFirstFlight_2	4.51	2.29	1.00	8.00
AirplaneSecondFlight_2	0.00	0.00	0.00	0.00
Fare_2	407.07	200.96	80.00	1390.00
DepartureTimeHours_3	11.66	3.34	6.00	18.00
ArrivalTimeHours_3	16.89	3.41	9.25	24.03
FlyingTimeHours_3	4.24	1.59	1.17	6.85
TripTimeHours_3	5.48	1.67	1.92	8.85
Legroom_3	2.53	1.13	1.00	4.00
AirlineFirstFlight_3	4.65	2.59	1.00	11.00
AirlineSecondFlight_3	4.65	2.65	1.00	11.00
AirplaneFirstFlight_3	4.50	2.31	1.00	8.00
AirplaneSecondFlight_3	4.50	2.28	1.00	8.00
Fare_3	405.20	197.68	80.00	1275.00

Table 6: Descriptive Statistics of Variables