

DATE: January 15, 2001
FROM: Joel Freedman
TO: TLUMIP Model Development Team
RE: Transport Model Mode Choice Component

This memo describes the combinations of modes used for tours reported in the 1994 Oregon household survey data. The memo is based on the grouping of activities into trips and tours as described in the memo dated October 6 2000, Transport Model Activity/Tour Component.

There were two distinct groups of data collected in the 1994 Oregon Household Survey; one set of data was collected for Metropolitan Planning Organizations (MPOs) and neighboring counties, including the Portland, Salem, Eugene, and Medford metropolitan areas as well as Marion, Polk, and Yamhill Counties. This survey effort collected rather detailed information on transit modes, in addition to typical auto-based trip information. Transit information collected as part of the MPO effort included mode of access and egress, number of transfers, specific routes transferred from/to, location of stops, and other information. In contrast, households collected in non-MPO areas, which includes those located in Clatsop, Coos, Deschutes, Josephine, Klamath, Lincoln, Malheur, and Umatilla counties (hereafter referred to as the 8-County data), have very few transit opportunities; therefore only the mode of transport was collected, and access/egress modes, transit boarding locations, and other information regarding specifics of the transit trip was not ascertained. Given the very few transit trips observed in the 8-County data, it is not expected that this lack of information will adversely affect model estimation.

A set of modes was defined based on the common information collected in all of the surveys. For auto trips, the mode definitions differentiate between driver or passenger as well as the number of vehicle occupants (1, 2, or 3+). For transit trips, the modes describe both the mode of access as well as mode of egress (walk, park-n-ride, or kiss-n-ride) and the main transit mode used (bus or, in the case of Portland households, light-rail). For non-motorized trips, the code distinguishes walk from bicycle. School bus trips are also accounted for.

Table 1 shows the breakdown of trips by mode for all survey respondents. There are a total of 221,148 trips in the survey (note: approximately 10% of trips were dropped from the survey due to the limit of two intermediate stops per tour). Most of these trips are auto (~87%), approximately 8% are non-motorized, almost 3% are by school bus, and the rest (approximately 2%) are by some form of transit. There are very few drive-transit trips in the survey.

In the tour-based travel demand approach, it is useful to describe the general mode used for the tour; this is defined as the tour mode. The logsum from the tour mode choice model is used as a measure of accessibility to select locations in tour destination choice models. Based on an analysis of the propensity to switch modes for trips on any given tour, a set of tour modes was defined for the Oregon Household Survey respondents. The tour modes are closely related to those defined for the San Francisco tour-based models. However, additional modes were defined which reflect the opportunity to switch between auto passenger and transit passenger at the tour mode choice level. For example, an HOV lane would increase the propensity to rideshare, as the Passenger alternative of the tour mode choice model would become more attractive. Additionally, transit usage might increase as a result of the lane because of the propensity to switch modes between transit and passenger for a tour. The tour mode choice model considers

both transit accessibility and auto passenger accessibility for the passenger-transit and the transit-passenger modes. The definitions of each tour mode are listed in Table 2, and tabulated in Table 3.

Table 1: Trips by Mode

Mode	Freq.	Percent	Cum.
Drv 1 Per	97021	43.87	43.87
Drv 2 Per	28122	12.72	56.59
Drv 3+Per	11851	5.36	61.95
Pas 2 Per	28848	13.04	74.99
Pas 3+Per	27279	12.34	87.33
Walk	15580	7.05	94.37
Bike	2584	1.17	95.54
Sch Bus	5879	2.66	98.20
Wlk-Bus-Wlk	3391	1.53	99.73
Wlk-Bus-PNR	122	0.06	99.79
Wlk-Bus-KNR	25	0.01	99.80
PNR-Bus-Wlk	85	0.04	99.84
KNR-Bus-Wlk	24	0.01	99.85
Wlk-MAX-Wlk	280	0.13	99.97
Wlk-MAX-PNR	32	0.01	99.99
Wlk-MAX-KNR	3	0.00	99.99
PNR-MAX-Wlk	20	0.01	100.00
KNR-MAX-Wlk	2	0.00	100.00
Total	221148	100.00	

Table 2: Tour Mode Definitions

Tour Mode	Definition
Driver	Any trip on tour is driver, no trips are school bus
Passenger	All trips on tour are passenger or non-motorized
Walk-All-The-Way	Only walk trips on tour
Cycle	Cycle trips on tour, no motorized trips
Walk-Transit	Walk-Transit trip on tour, no drive-transit trips on tour. Includes tours with passenger and transit on same half-tour.
Transit-Passenger	Any trip outbound is walk-transit and any trip inbound is passenger
Passenger-Transit	Any trip outbound is passenger and any trip inbound is walk-transit
Drive-Transit	Any trip is drive-transit
School Bus	Any trip on tour is school bus

Table 3: Trips by Trip Mode and Tour Mode

mode	tmode									Total
	Driver	Passger	Walk	Cycle	WlkTrn	Trn-Pas	Pas-Trn	Drv-Trn	SchBus	
Drv 1 Per	96946	0	0	0	0	0	0	0	75	97021
Drv 2 Per	28108	0	0	0	0	0	0	0	14	28122
Drv 3+Per	11845	0	0	0	0	0	0	0	6	11851
Pas 2 Per	2371	25386	0	0	26	227	107	17	714	28848
Pas 3+Per	1253	25028	0	0	24	78	55	6	835	27279
Walk	1354	1564	11532	127	468	47	20	16	452	15580
Bike	102	108	0	2320	11	1	1	2	39	2584
Sch Bus	0	0	0	0	0	0	0	0	5879	5879
Wlk-Bus-Wlk	221	0	0	0	2746	217	137	39	31	3391
Wlk-Bus-PNR	64	0	0	0	0	0	0	57	1	122
Wlk-Bus-KNR	7	0	0	0	0	0	0	18	0	25
PNR-Bus-Wlk	31	0	0	0	0	0	0	54	0	85
KNR-Bus-Wlk	2	0	0	0	0	0	0	22	0	24
Wlk-MAX-Wlk	34	0	0	0	225	7	11	2	1	280
Wlk-MAX-PNR	15	0	0	0	0	0	0	17	0	32
Wlk-MAX-KNR	1	0	0	0	0	0	0	2	0	3
PNR-MAX-Wlk	3	0	0	0	0	0	0	17	0	20
KNR-MAX-Wlk	0	0	0	0	0	0	0	2	0	2
Total	142357	52086	11532	2447	3500	577	331	271	8047	221148

Table 4: Tours by Tour Mode

tmode	Freq.	Percent	Cum.
Driver	58361	63.43	63.43
Passger	21626	23.50	86.93
Walk	5481	5.96	92.89
Cycle	1121	1.22	94.11
Wlk-Tran	1487	1.62	95.72
Tran-Pass	228	0.25	95.97
Pass-Tran	138	0.15	96.12
Drv-Tran	120	0.13	96.25
Sch Bus	3449	3.75	100.00
Total	92011	100.00	

Table 3 shows the grouping of trips by tour mode, and Table 4 shows the tours by tour mode. Table 3 reveals that approximately 10% of walk-transit-walk trips occur on tours where there are auto passenger trips, and another 10% of walk-transit-walk trips occur on tours where there are auto driver trips or drive-transit trips. Table 3 also shows that almost 75% of walk trips occur on tours with at least one other mode. Table 4 shows that almost 86% of tours utilized an auto driver or auto-passenger mode for at least one trip on the tour. The percentage of total tours using passenger for one leg and transit for the other is very small, only 0.35% total (even though those tours contain 10% of the total walk-transit trips). There are also a significant number of tours utilizing school bus for at least one trip on the tour (3.75%).

Some further work may be necessary to refine the tour and trip modes prior to or during model estimation. School bus tours, for example, may be combined with the next most appropriate tour mode, or dropped from the estimation data altogether. It remains to be seen whether the transit/passenger tour mode combinations can be estimated as stand-alone tour modes or whether the lack of observations in these categories warrants their combination with the walk-transit tour mode (as in the San Francisco models). Finally, in cases where there are both driver and transit trips on the same tour, a decision must be made whether to leave those tours coded as driver or perhaps recode them as drive-transit tours.