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Daniela Rohrbach-Schmidt

Imputation of missing signs for changes in real working hours in the BIBB Supplementary Task Survey to the BIBB/BAuA Employment Survey 2012

Version 1.0

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► Data availability
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1 Introduction

The BIBB Supplemental Task Survey to the Employment Survey 2012 (Alda et al. 2015) collects important characteristics of workers around one year after the main survey, i. e. the BIBB/BAuA Employment Survey 2012 (Hall et al. 2014). Both research data can be accessed as Scientific-Use-Files; the data are described in Alda et al. 2013 and Hall and Rohrbach-Schmidt 2013. Questionnaires and other documents can be downloaded online at the metadata repository of the BIBB-FDZ. The appendix shows the relevant questionnaire items for the imputation of the working hours as described below.

Important measures of the BIBB Supplemental Task Survey include wage changes and changes in contractual (*F11Std*, *F11Min*)[1] and real working hours (*F12Std*, *F12Min*). After field work was finalized, it became obvious that the absolute amount but not the signs of the change in working hours had been collected. Thus, from the data, it cannot be derived whether the working hours have increased or decreased by the respective hours. However, the data include information on whether wages have increased or decreased since the main interview (and by how much), as well as information on the average working hours at the time of the main interview (*az*), and indicators on whether the real working time has changed since then (*F12*). Additionally, for some respondents with changes in working hours, there are data on how many hours they regularly work each week at time t_2 (*F13Std*, *F13Min*). On the basis of these and other measures, the missing signs for real working hours[2] should be imputed because the weekly working hours are important variables for wage analyses. Table 1 gives an overview of the raw data.

Instead of imputing the signs directly, I impute the average real working hours at the time of the follow-up survey (t_2) in a two-step approach. Based on this imputed variable, the difference to the average real working hours at the time of the main interview (t_1) can be calculated so that the missing sign can be derived. One disadvantage of imputing the probability of a positive or negative sign by maximum-likelihood estimation is that this is less valid especially in the area of propensity-scores of around 0.5. The imputation of the continuous working hours avoids this problem because (after the selection model in the first step) the estimation is based on a linear regression model (see below). Moreover, the data include valid cases for the real working hours at time t_2 and relevant predictors for this measure. An additional advantage is that this approach allows the imputed signs to be validated by a comparison of the computed difference with the originally collected absolute values.

[1] Variable names are printed in italics and variables are named as in the SUFs of the main and follow-up survey, respectively.

[2] In the present paper, the procedure for the imputation of real working hours is described, which allows the deduction of the missing sign of the change in real working hours. No imputation is performed for the empirically less frequent case of changes in contractual working hours (n = 394). As opposed to the real working hours, there are no data on regular contractual working hours for workers who state that their contractual working hours have changed.

Table 1

Original data on real weekly working hours in the BIBB Supplemental Task Survey to the Employment Survey 2012 (unweighted)

Var.-name	*F12*	*F12Std*	*F12Min*	*F12xx*	*F13Std*	*F13Min*	*F13xx*
Question	Have your real weekly working hours changed since the main interview?	By how many hours...?		*F12Std*+ *F12Min*/60	And how many hours do you regularly work per week ...?[1]		*F13Std*+ *F13Min*/60
Valid cases[1]	Yes: 778 (18.8 %)	763	764	761	69 (9 % of F12 = Yes)	n = 69 (9 % of F12 = Yes)	69 (9 % of F12 = Yes)
Mean	–	9.7	2.0	9.8	47.7	0.7	47.7
Range	–	0–85	0–60	0–85	5–96	0–30	5–96

Notes: [1]Full questionnaire text is: "And how many hours do you regularly work on average per week in this job – including regularly performed overtime, excess work, and stand-by duty and so on?"

2 Valid cases and missing data generating process

Firstly, I inspect the valid cases with information on working hours at time t_2 (*F13Std*, *F13Min*) and calculate the difference in working hours between t_1 and t_2. I then compare the calculated difference with the value of *F12xx* (the absolute changes in real weekly working hours) and evaluate whether both measures correspond or whether the absolute amounts are largely different.

The regular working hours per week at time t_2 (*F13Std*, *F13Min*) were surveyed for respondents with changes in real working hours, whose internally[3] generated weekly working time was above 70 hours. The objective of the additional survey question was to validate the exceptionally high working hours[4]. Comparing the calculated difference with the originally surveyed values (*F12xx*) for those 69 cases who state that real working hours have changed[5], it becomes obvious that, in around one third of cases, the values of *F12xx* are equal to the values *F13xx* (see sample cases I_1, I_5 in table I in the appendix). In some cases, both values differ only in very few hours (and minutes). Especially in the case of high values of *F12xx*, it can be assumed that respondents have stated their weekly working hours instead of the number of hours that have changed.

These cases had a higher probability to fall into the group of respondents with more than 70 working hours and thus had a higher probability to be asked the regular weekly working hours question (*F13xx*). Likewise, the probability increased with higher values of *F12xx* and higher average working hours at the time of the main interview (*az)*. A comparison of cases with and without information on *F13xx* with regard to these and other variables shows that neither group is a sample of the same population indicating a MAR-mechanism. Further down, the MAR-assumption is tested using a logistic model.

Firstly, I generate an indicator *miss* for cases with changes in working hours (*F12* = 1) and missing and non-missing working hours at time t_2. In the follow-up survey, 3,359 of 4,356 respondents state that their working time has not changed since the main interview (*F12* = 2). In the case of 778 respondents, working time has changed (*F12* = 1). 213 respondents[6] are no longer in the labor force at time t_2 (unemployed, retired, unemployable, on maternity leave or home maker) or full-time apprentices. 6 respondents state “don’t know” or “no answer”. Out of 778 cases with a different working time at t_2 69 cases include information on how many hours these respondents work at time t_2 (*miss* = 0), and for 709 cases this information is missing (*miss* = 1).

Table 2 shows the descriptive statistics of the working hour variables at times t_1 and t_2 for workers with and without changes in working hours and *miss* equal zero and one, respectively. Workers with changes in working time and missing information at time t_2 have a working time at t_1 that is slightly below the average of workers without changes (37.69 hrs. with a maximum of 70 hrs. as compared to 37.84 hrs. and a maximum of 99 hrs.). On the contrary, respondents with

[3] Sum of *F12xx* and real working hours at time t_1 (*az*).

[4] Due to an incorrect filter instruction in the CATI program at the beginning of the field work, for all workers without a change in working hours the actual working hours (*F13Std*,*Min*) were surveyed. After this was noticed the filter was corrected. The 767 cases without changes in working hours as stated in *F12* but with information on *F13Std*,*Min* are not considered in the imputation model.

[5] For workers who state that their working time is the same as at the time of the main interview (*F12* = 2, nein), the difference between weekly hours at t_2 and t_1 should be zero. In 57 % of all cases, working hours at both measures differ by a maximum of one hour at maximum. In the remaining 43 % of cases, the difference is larger than one hour.

[6] Figures are based on the original data. In the SUF (http://dx.doi.org/doi:10.7803/610.12.1.1.20) all 220 retired workers or full-time apprentices were consequently filtered on this variable (see Alda et al. 2013, section 6.3).

changes in working hours and non-missing data, on average, have much higher working hours at t_1 (53.17 hrs.) and t_2 (47.7 hrs.).

Table 2
Distributional measures of weekly working hours (wh) in the Supplementary Task Survey

	Real working hours at t_1 (*az*)				Real working hours at t_2 (*F13xx*)			
	Mean	Stddev.	Min.	Max.	Mean	Stddev.	Min.	Max.
No changes in wh (*F12* = *2*) (n = 3.351[1]/3.359)	37.84	11.97	10	99	= t_1	= t_1	= t_1	= t_1
Changes in wh & *miss* = 0 (n = 69)	53.17	13.35	30	80	47.74	17.96	5	96
Changes in wh & *miss* = 1 (n = 707[1]/709)	37.69	11.42	10	70	–	–	–	–
Changes in wh (n = 776[1]/778)	39.07	12.41	10	80	–	–	–	–
Total (n = 4,127/4,137)	38.07	12.06	10	99	–	–	–	–

The missing data generating process at time t_2 is not random but – due to the filter instruction – dependent on observed variables, namely the working hours at t_1 (*az*) and the size of the change in working hours (*F12xx*). These measures are themselves confounded by other measures, which determine the missing data (selection) mechanism. I use a logistic regression model to identify these (additional) covariates that determine the missing data process of the unobserved data.

Table 3 displays the results of the regression model. In this model, workers with changes in working hours and *miss* = 0 represent the referent (case-wise deletion). The table includes logit coefficients and for statistically significant effects average marginal effects and discrete changes (AME/DC), respectively.

As expected, the model reveals significant logit coefficients for the working hour variables. Moreover, the probability of missing data on working hours at time t_2 is lower for workers without any vocational degree and workers with a vocational degree as the highest qualification as compared to university graduates. The probability of *miss* = 1 is also higher for freelancers as opposed to employees[7]. There are no significant differences between respondents who changed their employer or their job/their workplace within the same employer and workers with no such changes. Furthermore, workers without wage changes since the main interview do not differ from respondents with wage increases or decreases in the probability of missing information on working hours at time t_2[8]. Likewise, neither are effects of sex, migrant status, place of residence (East/West Germany) statistically significant nor other characteristics that might affect working

[7] I use the employment status at time t_2 for the regression model of *miss* (based on information from *Stib* and *F1*).

[8] I do not use wages at time t_2 as a predictor for the missing data and the working hours. Firstly, I want to avoid endogeneity problems (the working hours are required for analyses of hourly wages). Secondly, one can assume that unobserved heterogeneity in the wage variable (especially in the case of high wage changes) might bias the linear estimate of the slope for wages. The working hours at t_1 enters the model as a linear predictor as well as 2nd and 3rd degree polynomials because workers with very high/low working hours at time t_1 tend to reduce/increase their working time.

time (age, experience, highest education, marital status, and presence of children in the household).

Table 3

Logistic regression on missing working hours at time t_2 for workers with changes in working time (*F12* = 1 & *miss* = 1)

	Logit	AME/DC
Female worker (ref. male)	−0.14	
	(0.21)	
Residence in western part of Germany (ref. east. part)	0.11	
	(0.11)	
Age in years[1]	−1.00	
	(−0.71)	
Experience	0.05	
	(0.24)	
Experience squared/10	−0.01	
	(−0.26)	
Weekly working hours at t_1 (*az*)	−0.32***	−0.006
	(−5.84)	
Size of change in working hours (*F12xx*)	−0.29***	−0.005
	(−6.82)	
Highest vocational degree (ref. university degree):		
No degree	−3.97*	−0.073
	(−2.35)	
Firm-based/school-based vocational education degree	−2.23*	−0.041
	(−2.13)	
Employment status (ref.: employee)[2]:		
Blue-collar worker	2.13	
	(1.67)	
Civil servant	−0.84	
	(−0.80)	
Self-employed worker	1.87	
	(1.53)	
Freelancer	5.58**	−0.068
	(3.09)	
Marital status: married (ref. unmarried/divorced)	0.68	
	(0.92)	
Children under age 18 in the household (ref. no children)	−1.42	
	(−1.65)	

(Continuing Table 3)

	Logit	AME/DC
Native language German (ref.: not German)	0.13	
	(0.08)	
Highest educational attainment (ref. foreign/other degree)[3]:		
Hauptschulabschluss or equiv. (basic education certificate)	0.21	
	(0.10)	
Realschulabschluss/Mittlere Reife or equiv. (intermediate education certif.)	0.61	
	(0.30)	
(Fach-)hochschulreife, Abitur or equiv. (higher education entry qualification)	−0.38	
	(−0.20)	
Change of employer or workplace (ref. no change): Change of employer	0.67	
	(0.76)	
Change of workplace	0.51	
	(0.49)	
Change in gross monthly wages (ref. no change): Improvement	−0.58	
	(−0.84)	
Decline	−0.44	
	(−0.45)	
Constant	39.74	
	(1.87)	
N	726	
R^2	.793	

Notes: [1]The model additionally includes age[2]/10 and age[3]/100 (each not stat. sig.). [2]"Freie Mitarbeiter" (contractors, n = 4) and "Mithelfende Familienangehörige" (family workers, n = 3) all have *miss* = 1, meaning that no effects from these variables can be estimated and these cases are dropped from the analysis. [3]Workers with "no schooling degree" (n = 3) all have *miss* = 1, meaning that no effects from these variables can be estimated and these cases are dropped from the analysis. Results do not change substantially when another educational degree is set as the referent. *t*-statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3 Imputation

For imputation the two-step procedure described in Alda and Rohrbach-Schmidt (2011) is used, where the first step is a selection control and the real working hours at time t_2 are estimated in the second step. Real working hours at time t_2 are regressed on the variables considered in the logistic model of missing data, except the size of the change in working hours[9].

It is thereby assumed that a good approximation for the actual but unobserved working time at time t_2 is a result of adding a random error term e_i with standard deviation sigma to the estimated predicted value $x_i b$[10]. The random value e_i is drawn so that $x_i b + e_i$ is larger than (equal to) ten hours because the sample of the main survey consists of workers with at least ten working hours. In addition, I use multiple imputation (1,000 repetitions) and utilize the mean for each case.

As shown below, the imputed distribution of the working time variable is compared with the original distribution. Table 4 shows the mean, the standard deviation and the range of the original and the imputed variable.

Table 4
Measures of distribution of the original and imputed working time variable in the Supplementary Task Survey 2012

	Mean	Standard deviation	Min.	Max.
Original values (n = 69)	47.7	17.9	5	96
Imputed values (n = 704[1])	39.8	14.4	12.1	113
Imputed variable (n = 773[1])	40.5	15.0	5	113

Notes: [1]Cases with missing values on predictor variables were imputed by a model without these variables. I abstain from imputing the five cases with missing information on employment status (n = 3) or az (n = 2) in an even more reduced model.

A comparison of the means reveals that the average working time is clearly reduced by the imputation approach. The method is thus able to adjust the observed high working time caused by the filter instruction. As expected from the imputation method, the standard deviation declines.

Finally, the results from OLS-regression models are compared where the imputed and original values are regressed on relevant covariates (see columns 2 and 3 in Table II in the appendix, for columns 4 see below). The models also include those cases with no change in working hours (in these cases working time at t_2 is equal to working time at t_1). The set of variables clearly explains the variance in the working time variables. In most cases, the significance of estimates, the signs and effect sizes correspond. Notable differences between models result in effects from being em-

[9] The size is directly linked to the missing process. However, it is unclear how the size is associated with the working time. Moreover, there is neither a significant relationship nor does the inclusion improve the model fit and explained variance.
[10] Sigma is known from the observed distribution of the working time distribution.

ployed as a civil servant as opposed to an employee and a decline in gross wages versus no change in gross wages[11].

Based on the imputed variable, it is now possible to compute the change in working time as the difference between the working hours at the main interview and the follow-up survey. In a second step, the missing sign of *F12xx* can be derived by the following simple rule: the new variable is equal to the original value (absolute amount) and receives a negative sign if the computed difference from the imputed working time at t_2 to the working time at t_1 has a negative value. Measures of distribution of the original (*F12xx*) und newly computed variable (*F12xx_neu)* are displayed in Table 6. As it was originally intended with the surveyed data, it is now possible to generate the working time at time t_2 (*az_t2*) as the sum of the working time at t_1 (*az*) and the change in working hours by virtue of *F12xx_neu*. If one proceeds in this way, then six cases have values on *az_t2* equal to or below zero. Closer examination of these cases suggests that respondents specified their working time instead of the changed hours (see Table III in the appendix with values for these cases). Accordingly, the values for these cases were recoded into the values of *F12xx*[12]. Descriptive statistics for this newly generated working time variable (*az_t2*) are also displayed in Table 5. Furthermore, column 4 in Table II in the appendix includes a model of *az_t2*, thus the quality of this variable can be directly compared to the original and imputed working time variables.

Table 5

Measures of distribution of the original (*F12xx*) und corrected (*F12xx_neu*) variable on changes in working hours and the newly generated working time at t_2 (*az_t2*)

	Mean	Standard dev.	Min.	Max.
Original variable *F12xx* (see Table 1, n = 761)	9.8	12.0	0	85
Recoded variable *F12xx_neu* (n = 761)	0.8	15.5	−85	+70
Newly generated working time at t_2 (*az_t2*): *az* + *F12xx_neu* (n = 759[1])	40.0	13.3	1.5	135

Notes: [1] 2 Missing values on *az*. Includes six cases with corrected values.

Overall descriptive statistics and regression results show a good quality of the finally computed working time variable for the Supplementary Task Survey to the Employment Survey 2012.

The research data of the BIBB-Supplementary Task Survey to the Employment Survey 2012 include the imputed and newly generated variables *az_t2_imp*, *F12xx_neu*, *az_t2* und *indic_korr* in addition to the original variables.

[11] Workers with changes in working time experience a decline in wages much more often than workers with no changes. Workers with changes are, however, underrepresented in the model in column 3 (original data).
[12] In addition to *F12xx_neu*, the research data include an indicator for these six cases (*indic_korr*), meaning that further recodes can be performed easily by data users.

References

Alda, Holger; Rohrbach-Schmidt, Daniela; Tiemann, Michael (2013): BIBB Supplemental Task Survey to the Employment Survey 2012. BIBB-FDZ Data and Methodological Reports 4/2013.

Alda, Holger; Rohrbach-Schmidt, Daniela; Tiemann, Michael (2015): BIBB Supplemental Task Survey to the Employment Survey 2012. suf_2.0; Research Data Center at BIBB (ed.; data access); Bonn: Federal Institute for Vocational Education and Training. doi: 10.7803/610.12.1.1.20

Alda, Holger; Rohrbach-Schmidt, Daniela (2011): Imputation fehlender Werte für die Einkommensvariable in der BIBB/BAuA-Erwerbstätigenbefragung 2006. BIBB-FDZ Daten- und Methodenberichte 2/2011.

Hall, Anja; Rohrbach-Schmidt, Daniela (2013): BIBB/BAuA Employment Survey of the Working Population on Qualification and Working Conditions in Germany 2012. BIBB-FDZ Data and Methodological Reports 1/2013.

Hall, Anja; Siefer, Anke; Tiemann, Michael (2014): BIBB/BAuA Employment Survey of the Working Population on Qualification and Working Conditions in Germany 2012. suf_3.0; Research Data Center at BIBB (ed.,) GESIS Cologne (data access); Bonn: Federal Institute for Vocational Education and Training. doi:10.7803/501.12.1.1.30

Appendix I Additional Tables

Table I
Sample data

	az	*F12xx*: F12Std+F12Min/60	*F13xx*: F13Std+F13Min/60	*Diff: F13xx-az*
Sample case	Real working hours at t_1	Change in real working hours	Real working hours at t_2	Difference real working hours t_2-t_1
I_1	43	**50**	**50**	+7
I_2	80	12	92	+12
I_3	70	25	45	−25
I_4	70	15	55	−15
I_5	40	**45**	**45**	+5
...				

Table II
Working time (WT) models for original, imputed and newly generated variables

	WT t_2 (Imputation)	WT t_2 (original data)	WT t_2 (*az_t2_neu*)
Age in years[1]	−0.85	−0.72	−0.73
	(−1.67)	(−1.37)	(−1.49)
Experience	0.65***	0.66***	0.57***
	(6.35)	(6.21)	(5.68)
Experience squared/10	−0.08***	−0.07***	−0.06***
	(−4.40)	(−3.66)	(−3.21)
Highest vocational degree (ref. university degree): No degree	−8.27***	−4.91***	−6.05***
	(−9.89)	(−5.72)	(−7.45)
Firm-based/school-based vocational education degree	−6.18***	−3.06***	−4.34***
	(−11.09)	(−5.25)	(−8.02)
Employment status (ref.: employee): Blue-collar worker	−0.15	−0.17	−0.26
	(−0.29)	(−0.31)	(−0.50)
Civil servant	1.04	2.38***	1.68***
	(1.56)	(3.52)	(2.60)
Self-employed worker	7.08***	7.22***	6.92***
	(10.14)	(10.18)	(10.20)
Freelancer	9.33***	3.43**	5.05***
	(7.93)	(2.70)	(4.43)

(Continuing Table II)

	WT t_2 (Imputation)	WT t_2 (original data)	WT t_2 (*az_t2_neu*)
Contractors ("Freier Mitarbeiter")	−4.77	−3.04	−3.22
	(−1.53)	(−0.87)	(−1.07)
Family workers ("Mithelfende Familienangehörige")	−2.66	−4.36	−2.88
	(−0.92)	(−1.44)	(−1.03)
Marital status: married (ref. unmarried/divorced)	−1.67***	−1.39***	−1.47***
	(−4.26)	(−3.44)	(−3.89)
Children under age 18 in the household (ref. no children)	−3.21***	−3.48***	−3.40***
	(−7.21)	(−7.54)	(−7.87)
Native language German (ref.: not German)	0.46	−0.76	−0.41
	(0.53)	(−0.83)	(−0.48)
Highest educational attainment (ref. foreign/other degree): Hauptschulab. or equiv. (basic educ. c.)	3.35	4.34	3.91
	(1.15)	(1.48)	(1.38)
Realschulabschluss/Mittlere Reife or equiv. (intermediate education certif.)	2.57	3.57	3.18
	(0.88)	(1.22)	(1.13)
(Fach-)hochschulreife. Abitur or equiv. (higher education entry qualification)	1.46	4.47	3.13
	(0.50)	(1.51)	(1.10)
No vocational degree	4.61	5.06	6.78*
	(1.32)	(1.42)	(2.00)
Change of employer or workplace (ref. no change): Change of employer	0.02	−0.34	0.75
	(0.02)	(−0.28)	(0.83)
Change of workplace	2.93**	2.75**	2.82**
	(2.64)	(2.07)	(2.62)
Change in gross monthly wages (ref. no change): Improvement	2.73***	1.96***	2.23***
	(6.49)	(4.46)	(5.45)
Decline	−3.96***	0.65	−2.56**
	(−4.44)	(0.62)	(−2.95)
Residence in western part of Germany (ref. east. part)	−2.14***	−2.39***	−2.28***
	(−4.43)	(−4.84)	(−4.88)
Female worker (ref. male)	−6.52***	−8.70***	−7.41***
	(−17.36)	(−22.47)	(−20.36)
Constant	55.48***	53.17***	53.72***
	(6.78)	(6.27)	(6.78)
N	4021	3338	4006

Notes: [1]The model additionally includes age^2/10 and age^3/100 (each not stat. sig. except age^3 in model of *az_t2_neu*). *t*-statistics in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table III

Sample data (6 cases with *miss*=1 and values<= zero[1] on the newly generated working time variable (*az_t2_neu*)

	az	*az_t2_imp* (rounded)	*diff_az_imp* (*az_t2_imp*-*az*, rounded)	*F12xx*	*F12xx_neu*	*az_t2* (*az*+*F12xx_neu*)[1]
I_1	20	15.5	−4.5	25	−25	−5
I_2	20	18.6	−1.4	30	−30	−10
I_3	45	36.0	−9.0	60	−60	−15
I_4	20	16.3	−3.7	24	−24	−4
I_5	40	35.8	−4.2	40	−40	0
I_6	20	14.5	−5.5	20	−20	0

Notes: [1] These six cases were finally recoded into their values of *F12xx*.

Appendix II Questionnaire extract from the BIBB Supplemental Task Survey to the Employment Survey 2012

The complete questionnaire can be downloaded online at the metadata repository of the BIBB-FDZ

F12	**Has your actual weekly working time (including regular overtime worked, extra work, on-call duty, etc.) changed?** INT: On request: in the main survey that was [<az>] hours		
	<1> Yes, it has changed		⇨ continue with F12xx
	<2> No, it is unchanged		⇨ continue with F14
	<8> Not known/Not specified		⇨ continue with F13xx
F12xx if F12 = <1>	**By how many hours per week has your actual weekly working time changed?** INT: What we are interested in here is the difference between the previous number of hours actually worked and the current number of hours actually worked. INT: Do not convert full hours!		
	! __ hours <F12Std>	! __ minutes <F12Min>	⇨ if F12xx+az>70 continue with F13xx
	<98> Not known <99> Not specified		⇨ continue with F14
F13xx if F12xx + display from F12 > 70 or if F12 = <8>	**And how many hours do you normally work on average per week in this activity – including regular overtime worked, extra work, on-call duty, etc.?** INT: Do not convert full hours!		
	! __ hours <F12Std>	! __ minutes <F12Min>	
	<98> Not known <99> Not specified		

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