Paper

Driving licence and next, a car?

A study of car ownership among young workers and students

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Contents

Which factors influence car ownership among young adult students and workers with a driving licence? Car ownership among 18 to 29-year-olds is now lower than ten years ago. Literature on this topic provides a range of explanations for the decrease in car ownership among young people. This study analyses the interdependent effects of several characteristics by means of descriptive and multivariate logistic regression models. Young adults are at various stages of life; this study therefore differentiates between young people in education and those in employment. The following characteristics were examined: driving licence ownership, age, gender, degree of urbanisation, household composition, presence of cars in the household, income and ethnicity. The effects of these variables were studied using an integral dataset containing all students and employed young adults aged 18 to 29 years. For this study, the population register was enriched with background characteristics and car and driving licence ownership information. The integral dataset offered the possibility of a detailed breakdown according to background characteristic with a high level of accuracy. This study shows that income and age have the most significant effect on car ownership among students. For young working people, degree of urbanisation and income were most predictive of car ownership.

1. Introduction

Car ownership determines car use and therefore future mobility. Young adults have the option of obtaining a driving licence and perhaps buying a car. At the start of 2015, there were 2.5 million people aged between 18 to 29 years in the Netherlands. Nowadays, car ownership is less common among this group than it was 10 years ago. At the start of 2005, 313 out of every 1,000 young adults owned a car. At the start of 2015, this declined to 283 in every 1,000.

In many other developed countries, car and driving licence ownership among young adults has decreased as well. In Germany, car ownership among youths has decreased since the turn of the century. In addition, in Norway, Sweden, the United Kingdom and the United States, driving licence ownership among young adults has decreased (Delbosc, Currie, 2013; Kuhnimhof et al., 2012; Coogan, Nygaard & Weinberger, 2017).

Researchers provide a number of explanations for the decrease in car ownership and car use among young adults. Factors such as living environment (degree of urbanisation), household composition and the social and economic position of young adults have proved to be variables that influence car mobility of young adults (Jorritsma, Berveling & Van der Waard, 2013; Goudappel Coffeng, 2015; KiM, 2014; Coogan, Nygaard & Weinberger, 2017; Oakil, Manting & Nijland, 2016).

Jorritsma et. al. (2013) point out that more young people are students than ten years ago, whilst fewer are employed. Over the past decade, the number of students has increased by 40 percent, while the number of young adults with jobs has decreased by 20 percent. This has influenced the mobility of young adults as their car mobility tends to increase when they start working (Goudappel Coffeng, 2015).

Furthermore, young adults start their career at a later age compared to 10 years ago (Statistics Netherlands, 2015a). The share 25-year-olds with a permanent employment contract decreased from 56 percent in 2004 to 38 percent in 2014. This is partially because young adults graduate at a later age, but also due to an increase in flexible contracts and the increase in youth unemployment caused by the financial crisis.

Because young people spend more time in education, they also move in together at a later age and postpone important so-called 'life events' such as buying a house and starting a family (Statistics Netherlands, 2014a; Statistics Netherlands, 2015a; Goudappel Coffeng, 2015). These 'life events' often lead to a substantial increase in car use among young adults (Goudappel Coffeng, 2015). A study by Oakil et al. shows that families with children are most likely to own a car; according to the authors, this supports the idea that families with children are more dependent on the car than singles and couples, due to their complex daily needs (Oakil, Manting & Nijland, 2016).

The fact that young adults spend more time in education also means a rising number of young people live in urban areas. This has resulted in a shift from the car to the bicycle and public transport (Jorritsma, Berveling & Van der Waard, 2013).

Other factors that influence car ownership among young adults are the perceived status and prestige of owning a car and attitudes among this group towards cars. There are trend watchers who have observed that young adults consider owning a car to be less important compared to older people. Young adults do want a driving licence, but owning a car is no longer 'hot' (De Vré, 2013). Also, young adults are more open towards sharing a car than older people (KpVV, 2014; Coogan, Nygaard & Weinberger, 2017). However, research by the Netherlands Institute for Transport Policy Analysis (KiM) among young Dutch people indicates that youths are not abandoning their plans to buy a car, but are merely postponing them. Young adults settle at a later age, but once they are settled their car use increases. Thus, KiM concludes that the attitude of young people towards cars has not changed (KiM, 2014). In line with these results, American youths indicate that they expect to use a car more often when they are older (Coogan, Nygaard & Weinberger, 2017).

In order to improve our knowledge of changes in car ownership among young adults in the Netherlands, it is important to know what factors influence car ownership among them. This paper examines whether – and to what extent –the variables mentioned earlier influence car ownership among employed youths and students aged 18 to 29 years. Nearly half of all Dutch 18 to 29-year-olds are employed; one-third are in education. Young adults can be at very different stages of life. Some live with their parents while others have moved out and have started a family. Some young adults have more money to spend than others. Sixty percent of students have a driving licence and 8 percent own a car. Of all employed youths, 83 percent have a driving licence and 48 percent own a car.

2. Research method

2.1 Research population

The research population of this study comprises people aged 18 to 29 years who were registered in the Dutch Personal Records Database (BRP) on 1 January 2015. Within this group, we distinguish between those in employment (employed young adults) and those in education (students). These are defined as follows:

Students: Young adults aged 18 to 29 years who are enrolled in an educational institution and may have a part-time job that earns less than the low-income limit. Of all Dutch young adults, 35 percent are students. This includes students in government-funded education and students receiving study grants for other educational institutions (in the Netherlands or abroad). Students registered at private or foreign educational institutions who do not receive study grants are not included.

Employed young adults: Young adults aged 18 to 29 years whose income from employment (either as self-employed or as salaried employees) is higher than their other sources of income (e.g. unemployment benefits or social assistance benefits). This group also includes students who earn more than the low-income limit. Of all Dutch young adults, 49 percent are employed.

Other: People who are not enrolled in an educational institution and whose income from other sources (benefits) is higher than or equal to their income from employment. This group is also known as the NEETs (Not in Employment, Education or Training). These young people are neither working nor studying. Of the 18 to 29-year-old Dutch population, 16 percent belong to this group. They can be in varying situations. A large part of the group are unemployed and are both looking and available for work on the labour market. A part of the young adult group who were neither working nor studying on the reference date were unable to do so due to illness or disability (Statistics Netherlands, 2015b). Due to the diversity in the NEETs group, this study does not examine their car and driving licence ownership levels.

2.2 Data and data matching

For this study, we combined integral microdata on mobility, demography, region, employment and income, with reference date 1 January 2015. To merge the data, the System of Social Statistical Datasets (SSD) of Statistics Netherlands was used. This is a system of datasets which have been made compatible. The SSD contains anonymous microdata on a wide range of topics.

Car ownership

In this study, a person is classified as a car owner if they owned one or more passenger car(s) on 1 January 2015 that was registered in the licence plate register of the Dutch National Road Authority (RDW). In this context, 2 percent of Dutch youths owned multiple cars. In the situation where a young person registered their car not as their own but under their parent's name, the parent was classified as the car owner. Because it is unknown who registered their

car under their parent's name, these young people were not classified as car owners in this paper.

In the descriptive analyses (Section 3 and 4), young adults were classified as car owners when they owned one or more cars , but also young adults who paid an additional tax liability for a lease car. Although they do not own the lease car (RDW registers these vehicles as owned by the company), these youths do have the opportunity to use it.

In the multivariate analysis (paragraph 5), those who had lease cars were not classified as car owners. This was done in order to keep car ownership the same for students and working youths. After all, working youths are the ones driving company cars, not students. The expectation is that having a company car is primarily explained by the type of job (company type and position).

Driving licence ownership

Using the driving licence register of RDW, it was determined who had a driving licence on the reference date, 1 January 2015. The register contains all holders of Dutch driving licences for passenger cars, motorcycles, mopeds, busses or lorries and trailers. The driving licence data was merged with the population cohort aged 18 to 29 years who were registered in the BRP. Because the BRP population was used, numbers in this paper differ from the numbers published in the Statline table 'People with a Dutch driving licence', which also includes Dutch driving licence owners who did not live in the Netherlands at the time.

Income and work

Whenever the term 'income' is used in this paper, it is used to refer to 'personal income'. Personal income consists of personal gross income minus premiums paid for income insurance. Personal income includes the total of income from employment, income from private enterprise, payment of income insurance and income from social provisions (excluding child benefits and child related budget). Premiums of income insurance (excluding premiums for national insurance policies) have been deducted. Study grants are also part of young adults' personal income.

As of 1 September 2015, the Dutch system of study grants for higher education has changed. The grant for new bachelor and master students is no longer a gift, but a (voluntary) loan (Rijksoverheid.nl). This paper describes the situation as it was in 2014, when students still received their student grant as a gift.

This paper also looks at the number of hours of employment and contract. For 10 percent of employed young people and for 13 percent of the students with part-time jobs, this information is unknown. This concerns for example self-employed and people who work in a family business.

Migration background

The classification Western/non-Western migrant has been operationalised according to the regular definition of Statistics Netherlands, based on socioeconomic and sociocultural position. More specifically, migrants from elsewhere in Europe (excluding Turkey), North America, Oceania, Indonesia and Japan are categorised as migrants from Western countries.

Analyses

The first part of this paper describes the effects of each variable separately on the dependent variable, car ownership, for students and employed youths.

In the second part, a multivariate logistic regression model is used to determine the effects of the independent variables on a dependant dichotomous variable. A logistic regression model was used because the dependent variable Y consists of two categories (owning a car or not) (Greene, 2003).

This model uses the equations below:

$$P(Y) = \frac{1}{1 + e^{-(b_0 + b_1 X_1 + \cdots + b_n X_n + \epsilon)}} \quad (1)$$

This equals

$$\ln\left(\frac{P(Y)}{1 - P(Y)}\right) = e^{b_0 + b_1 X_1 + \cdots + b_n X_n + \epsilon} \quad (2)$$

This model calculates the odds P(Y) for variable Y, in this model that means the odds for owning a car. This comes down to explaining the natural logarithm (ln) of the odds ratio. This is also known as log odds. By transforming these log odds by means of the number e, the odds can be displayed. These odds can then be interpreted as a percentage change as opposed to the reference category of a certain factor variable.

3. Results

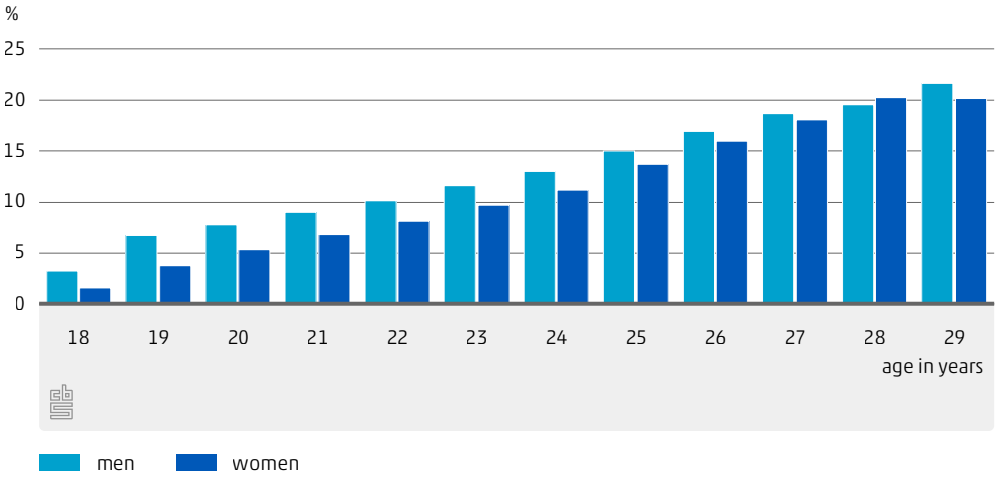
3.1 Car ownership of students

At the beginning of 2015, there were nearly 871 thousand students in the Netherlands aged 18 to 29, with an average age of 21. Alongside their studies, some of these students also had a part-time job. Some students lived at home with their parents, others had moved out. Most students had a free student travel card for public transport, making travelling by public transport an attractive option. There were 66 thousand students who owned a car: 8 percent of all students. This paragraph offers a descriptive analysis of a number of variables that, according to literature, influence car ownership of young adults.

Age and gender

Car ownership of students increases with age. Of the 18-year-old students 2 percent own a car, while among 29-year-old students car ownership lies at 21 percent. The car ownership of female students lags behind that of male students. Of the male students, 9 percent own a car, of female students 6 percent owns one.

3.1.1 Car ownership of students by age and gender, 2015

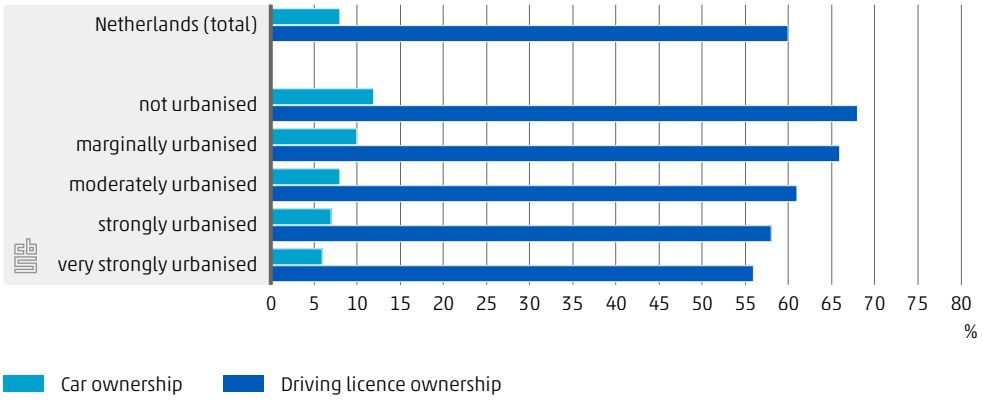


Source: CBS, RDW.

Lower car ownership among students in university cities

Two-thirds of all students live in a strongly to very strongly urbanised environment. Car ownership is lower in cities than in rural areas. KiM (2016) states a number of explanations for the lower level of car ownership in urban areas in their publication 'Mobiliteitsbeeld'. According to KiM, one of the explanations is that driving licence ownership is lower in urban than in rural areas. Also, cities have a more elaborate public transportation network, and people make more trips by bicycle, which reduces the need to own a car. Spatial factors, for example high building density, and the distance to activity locations play a role as well. Students who live in areas with a strong or very strong degree of urbanisation have lower car rates of ownership (6 percent) than students who live in moderately urbanised, marginally urbanised or non-urbanised areas (10 percent).

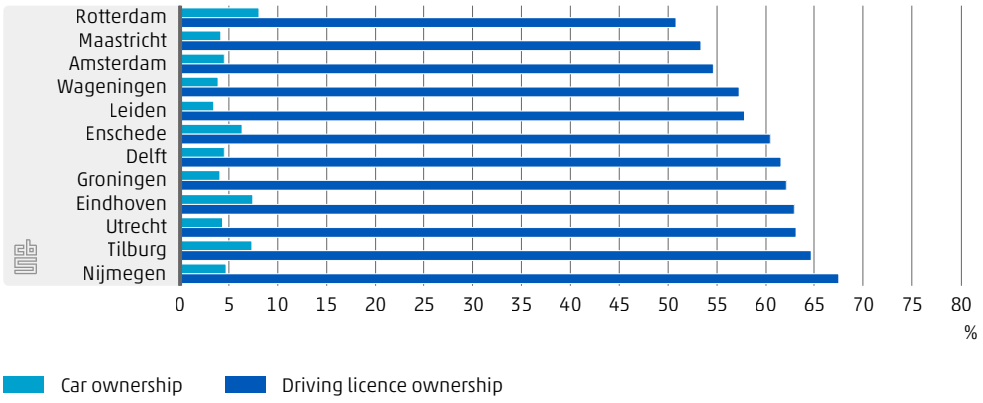
3.1.2 Car and driving licence ownership of students by degree of urbanisation, 2015



Source: CBS, RDW.

One-third of all students live in one of the university cities in the Netherlands (Statistics Netherlands, 2017c). Of the students living in university cities, 5 percent own a car and 59 percent have a driving licence. Car ownership is therefore lower compared to students living outside of the university cities; 9 percent of these students own a car. Driving licence ownership on the other hand is comparable among students living in and outside of university cities.

3.1.3 Car and driving licence ownership of students in university cities, 2015



Source: CBS, RDW.

There are also some differences between the university cities. Of the students who live in Nijmegen 67 percent have a driving licence, whilst for students in Rotterdam this is 51 percent. However, students in Rotterdam do have the highest level of car ownership: 8 percent own a car, versus only 3 percent of all students in Leiden.

Similar car ownership of students living independently or with their parents

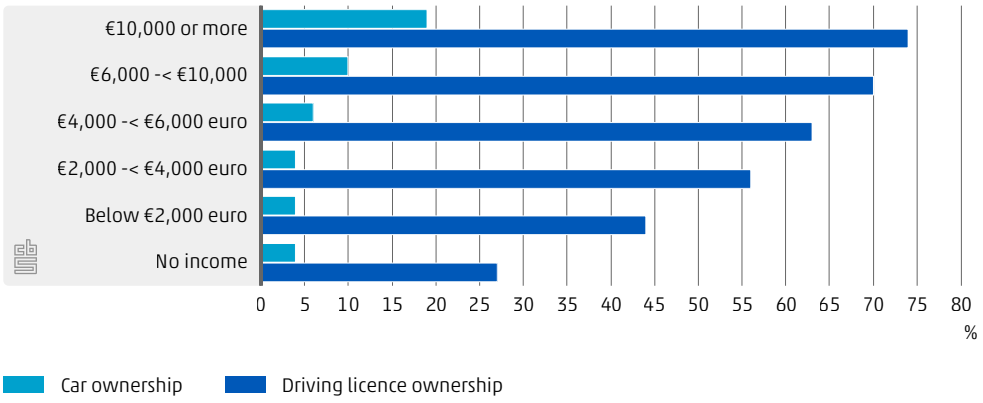
The majority of students, 60 percent, live with their parents. Students who live with their parents and who are able to use their parents' car on occasion could be less inclined to buy a car of their own. Still, it turns out there is hardly any difference between car ownership of students living with their parents and students who have moved out. Of students living with their parents, 7 percent own a car and 8 percent of students who live independently own one. Driving licence ownership on the other hand is slightly higher among students who have moved out (62 percent) than among students who live with their parents (58 percent).

4 percent of students with no income own a car

A small share of the students (5 percent) had no income in 2014. Of this group 27 percent had a driving licence and 4 percent owned a car. Furthermore, 84 percent of students had a personal income between €0 and €10,000 per year. Driving licence ownership in this group was a lot higher compared to students without income, however, the difference in car ownership was small. Of students in this income category, 60 percent had a driving licence

and 6 percent owned a car. Car ownership is higher among students with a higher income. Of students with an income annual income over €10,000, more than 74 percent had a driving licence and 19 percent owned a car.

3.1.4 Car and driving licence ownership of students by income group, 2014



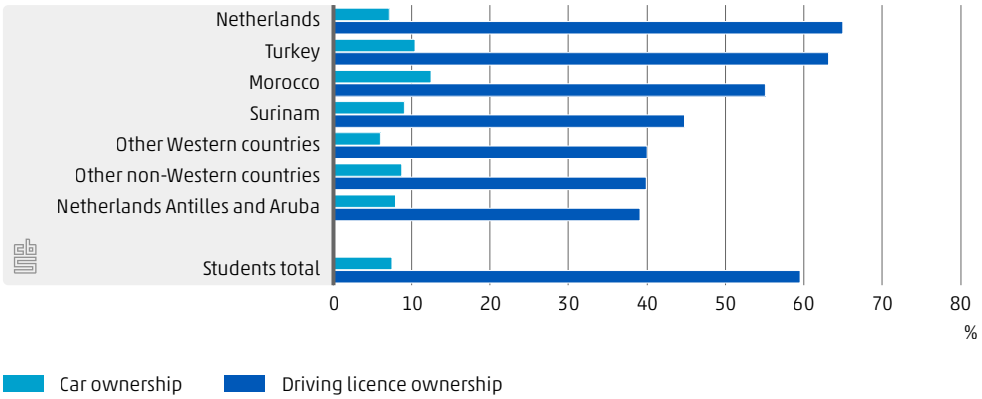
Source: CBS, RDW.

More than half of students have a part-time job (59 percent). Part-time jobs in the catering industry and in retail are most popular (Statistics Netherlands, 2014b). Students with a part-time job have a car and a driving licence more often than students who do not have a part-time job. Nine percent of students with a part-time job have a car as opposed to 6 percent of students without a part-time job. Of students with a part-time job of more than 75 hours a month, 13 percent own a car.

Lowest car ownership among students with a Western background

Students aged 18 to 29 years who have a western migration background have the lowest car ownership. Of students with a Dutch background 7 percent own a car, for students with a migration background from other western countries this is 6 percent. Interestingly, car ownership is highest among students with a Turkish or Moroccan background. Of the students with a Turkish background 10 percent owns a car as opposed to 13 percent of students with a Moroccan background. Looking at driving licence ownership, students with a Dutch background are most likely to have a driving licence (65 percent).

3.1.5 Car and driving licence ownership of students by migration background, 2015



Source: CBS, RDW.

If we examine only the students who have a driving licence and then look at car ownership, the results are different: students with a Dutch background have the lowest car ownership, and students with a non-western background have the highest.

Conclusion

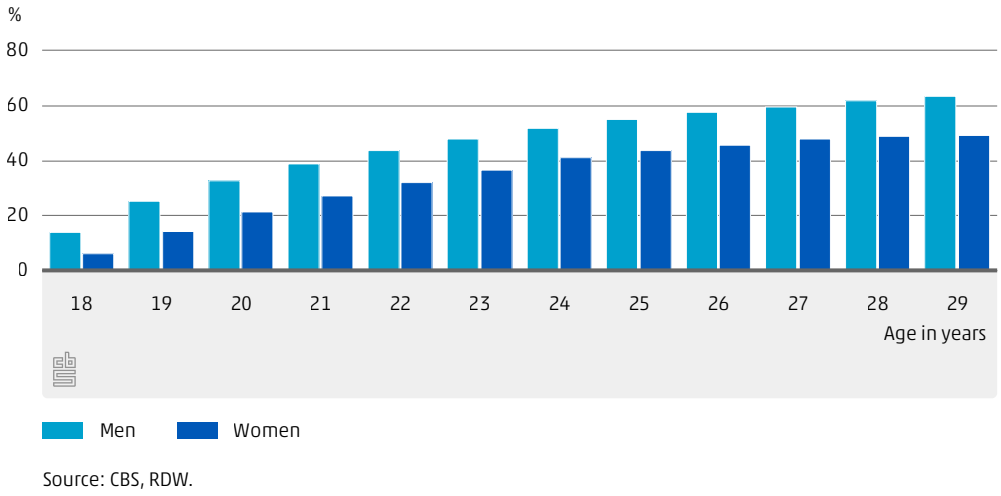
Car ownership of students is relatively low, they are more likely to use public transport or a bicycle than a car (CBS, 2016). The car ownership of male students is higher than the car ownership of female students. Degree of urbanisation influences car ownership as well. Car ownership is lowest among students who live in very strong urbanised areas, including the university cities. There appears to be hardly any difference in car ownership between students who live with their parents and students who have moved out. Students who have a part-time job have higher car ownership than students who do not have a part-time job.

This raises the question how all these background characteristics influence car ownership when they are not analysed separately but together. Which characteristic has most influence? This question will be answered in paragraph 5, the multivariate analysis.

3.2 Car ownership young employed population

At the beginning of 2015, the Netherlands counted well over 1.2 million employed young adults. This group had an average age of 25 years, which is 4 years older than the average age of students. Furthermore, both car and driving licence ownership were higher in the employed group in comparison to the student group, 83 percent of the employed group had a driving licence, compared to 60 percent of the students. Moreover, 49 percent of the employed group owned a car, while only 8 percent of the students owned a car. In the current paragraph, we provide an overview of the variables for the young employed group.

3.2.1 Car ownership employed young adults by age and gender, 2015



Source: CBS, RDW.

Four out of ten young employed female adults own a car

With 52 and 42 percent respectively, car ownership was higher among young employed men compared to young employed females.

It is also apparent for the employed group that car ownership increases with age, as 11 percent of the 18-year-olds in the employed group had a car, while 57 percent of the 29-year-olds owned a car.

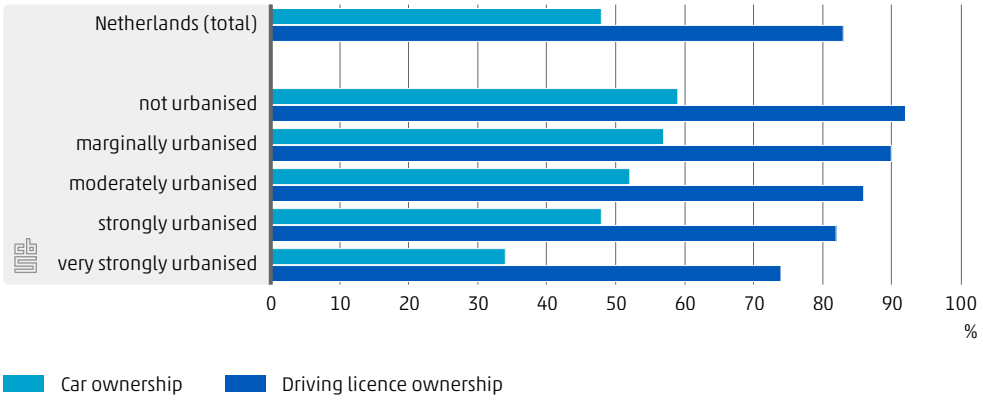
Young employed men drive a lease car from work more than women

Young employees can also drive a leased car. Although these vehicles are often registered under the employer's name, they are likely to be used for personal use as well. Currently, 6 percent of employed young adults drive a leased car for which they pay additional tax liability. However, there is a discrepancy between genders. While 8 percent of all young employed men drive a leased car, only 3 percent of young employed women drive one.

Car ownership is lower in cities

Young employed men and women live in less urbanised environments compared to students. While one-third of all students live in very strongly urbanised environments, only one-quarter of employed adults live in an area with that degree of urbanisation. Similar to students, car ownership is also higher among employed young adults living in non-urbanised areas compared to very strongly urbanised areas. 59 percent of young employed adults living in non-urbanised areas own a car, while only 34 percent of young employed adults living in very strong urbanised areas own one.

3.2.2 Car and driving licence ownership of employed young adults by degree of urbanisation, 2015

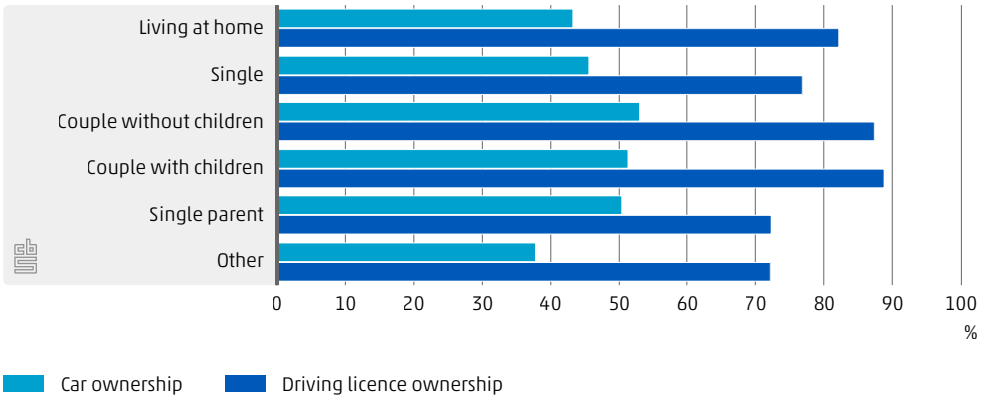


Source: CBS, RDW.

Young employed adults that live on their own, own a core more often

Young adults that live with their parent(s) are more likely to be able to make use of another car in the household. In 2015 94 percent of all households of couples with children owned one or more cars (Statistics Netherlands, 2017b). However, once their children leave the parental household, it becomes less convenient to borrow their parents car. Furthermore, although there is no difference in driving licence ownership between employed young adults that live on their own versus young employed adults that live with their parents, car ownership is different between these groups. While 50 percent of the group living on their own a car, only 43 percent of the group living with their parents own one. This is in contrast with non-employed students, where there is no difference in car ownership between students that live on their own and students that live with their parents.

3.2.3 Car and driving licence ownership employed young adults living with parents or independently, 2015

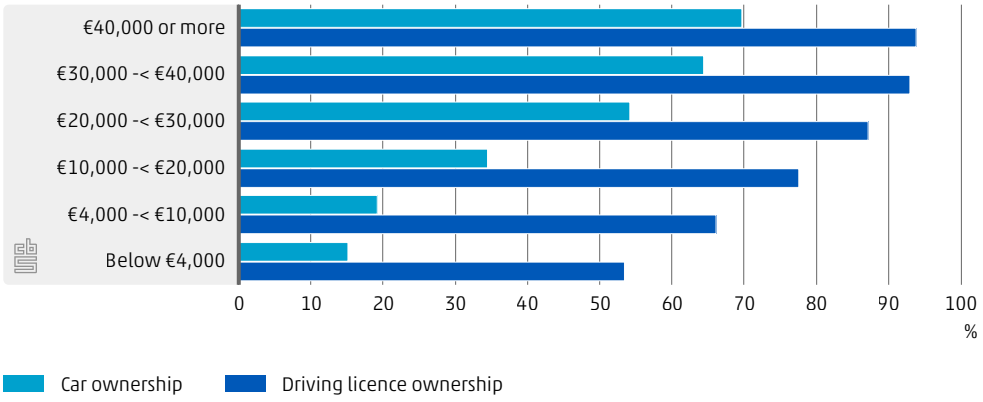


Source: CBS, RDW.

Car ownership increases with income

Young employed adults with a low annual personal income are less likely to own a car than employed young adults with a higher annual income. Of all 18 to 29-year-olds who earned less than €4,000 in 2014, 52 percent had a driving licence and 15 percent owned a car. Furthermore, the vast majority (94 percent) of the group with an annual personal income of over €40,000 euro had a driving licence and 70 percent owned a car.

3.2.4 Employed young adults with a driving licence by income group, 2014



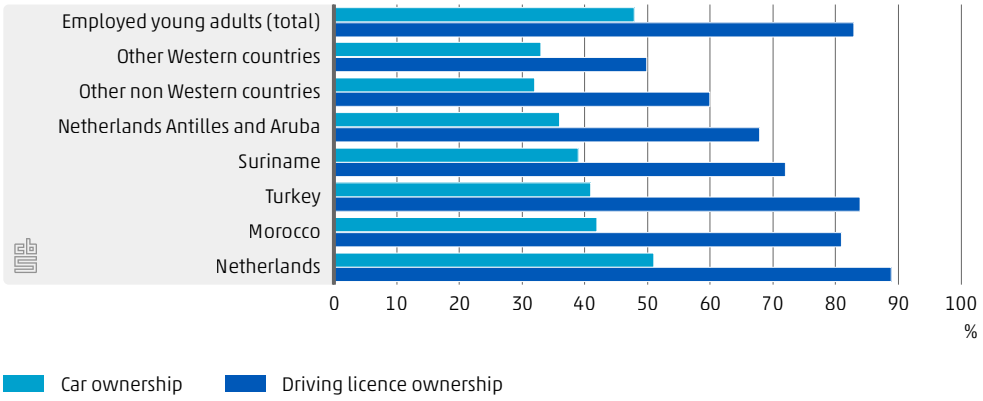
Source: CBS, RDW.

On another note, young adults who were employed under a permanent contract were more often owner of a driving licence and a car compared to young adults with a temporary employment contract. Thus, 57 percent of young adults with a permanent contract owned a car, versus 42 percent of young adults with a temporary contract.

Car ownership highest amongst young working adults with a Dutch background

Just as was observed for students, driving licence ownership was highest amongst young employed adults with a Dutch background. However, while students with a Turkish or Moroccan background owned a car more often compared to Dutch students, this was not the case within the employed group. Here, the group with a Dutch background presented the highest car ownership levels. Furthermore, while young employed adults with a Dutch background showed the highest degree of car ownership, young employed adults with other non-western migration backgrounds displayed the lowest share of car ownership.

3.2.5 Car and driving licence ownership of empoyed young adults by migration background, 2015



Source: CBS, RDW.

Conclusion

More young employed men own a car than young employed women. In addition, young employed men are also more likely than young employed women to have a leased car. Furthermore, young adults who live on their own are more likely to own a car than young adults who live in the parental household. It also became evident that young individuals with a higher income are more likely to own a car compared to individuals on a lower annual income. Next, young individuals with a permanent employment contract also owned more cars compared to individuals with a temporary employment contract. Lastly, car ownership was lowest in areas with a very high degree of urbanisation, and highest in areas with a very low degree of urbanisation.

We described car ownership levels amongst young employed adults and students with different background characteristics. Next, in paragraph 5, we will further investigate the contribution of these background characteristics to car ownership using multivariate analysis.

3.3 Multivariate analysis

In the previous two paragraphs, we described levels of car ownership among studying and employed young adults with different background characteristics. In actual practice, these characteristics do affect car ownership in concert with one another and could have combined effects on car ownership. Therefore, we will use a multivariate model to determine the individual contribution of these characteristics to car ownership. Furthermore, based on literature research and the aforementioned descriptive analysis, we expect that certain variables determine car ownership among employed and studying young adults. Therefore, these variables will be analysed using logistic regression analysis (see box below). Importantly, since owning a driving licence is mandatory to be able to drive a car, it is an important factor in the determination of car ownership. For this reason, we only selected the population that does own a driving licence for the multivariate analysis.

Logistic regression analysis

In the current analysis, the dependant variable Y will be analysed in two defined categories (does or does not own a car). Therefore, logistic regression analysis will be used (Greene, 2003). This analysis will usually result in an odds ratio. This odds ratio represents how many times more often 'yes' will be the result compared to 'no' in comparison to the reference group. In this context, a positive effect will display an odds ratio value over 1, while a negative effect will result in an odds ratio between 0 and 1.

Logistic regression analysis students

The interplay between the dependant variable car ownership (yes or no) and several independent variables, the predictors, were determined using logistic regression analysis. Table 1 displays an overview of the results for young adult students with a driving licence. Every single variable seems to exert influence on car ownership.

Previous research by both the department of infrastructure and environment (I&M, 2016) and Goudappel Coffeng (2015), demonstrated that car ownership increases with age. Moreover, so-called 'life events' such as moving out of the parental household or a first job play an important part in this. Indeed, our logistic regression analysis, as shown in Table 1, demonstrates that car ownership increases with age, and that a 29-year-old student with a driving licence was 4.8 times more likely to have a car compared to an 18-year-old student with a driving licence.

Young female students with a driving licence are 21 percent less likely to own a car compared to male students. However, whether this is determined by differences in income or living situation has not been investigated.

Furthermore, according to KiM (KiM, 2016; Goudappel Coffeng) car ownership in the Netherlands is below the national average in areas with a high degree of urbanisation, the same holds true for young adults. In agreement with these previous reports, our multivariate analysis among owners of a driving licence demonstrated a negative correlation of degree of urbanisation and car ownership, as students living in an area with a high degree of urbanisation had 72 percent less chance of owning a car compared to students living in a non-urbanised area.

KiM points out that young adults can often borrow a car, as 75 percent of young adults with a driving licence had access to a car from family and/or acquaintances (KiM, 2014). Furthermore, it is expected that individuals who have access to someone else's car are less likely to buy their own car. In this paper, we report that 56 percent of students have a car present within the household. When this is the case, a student might be less inclined to buy a car. Indeed, the multivariate analysis demonstrates that when there is another car present in the household, a student is 47 percent less likely to own a car.

3.3.1 Logistic regression for car ownership among students with a driving licence, 2015

	Coef.	Std. Error	Odds	Significance*
Age	**Reference**			
18 yrs				
19 yrs	0.173	0.022	1.189	Yes
20 yrs	0.210	0.022	1.233	Yes
21 yrs	0.338	0.022	1.403	Yes
22 yrs	0.458	0.023	1.581	Yes
23 yrs	0.657	0.023	1.928	Yes
24 yrs	0.855	0.024	2.351	Yes
25 yrs	1.145	0.026	3.144	Yes
26 yrs	1.362	0.028	3.903	Yes
27 yrs	1.526	0.032	4.598	Yes
28 yrs	1.674	0.038	5.331	Yes
29 yrs	1.760	0.044	5.810	Yes
Gender				
Male				
Female	–0.230	0.009	0.795	Yes
Degree of urbanisation				
Not urbanised				
Marginally urbanised	–0.249	0.018	0.780	Yes
Moderately urbanised	–0.523	0.019	0.593	Yes
Strongly urbanised	–0.806	0.018	0.447	Yes
Very strongly urbanised	–1.268	0.019	0.282	Yes
Position in household				
Lives at home				
Moved out	–0.600	0.015	0.549	yes
Other car in household				
No				
yes	–0.634	0.014	0.530	yes
Income class (annual personal income)				
below €2,000				
€2,000 -< €4,000	0.014	0.019	1.014	No
€4,000 -< €6,000	0.257	0.018	1.293	yes
€6,000 -< €10,000	0.638	0.017	1.892	yes
€10,000 or more	1.289	0.017	3.630	yes
Ethnicity				
Dutch				
Western migration background	0.307	0.019	1.359	yes
Non-western migration background	0.672	0.012	1.959	yes

* p < 0,001

Additionally, it is of importance whether a young adult lives independently or within the parental household. Young adult students living on their own are 45 percent less likely to own a car than students living with their parents. This is in disagreement with the expectation that car ownership would be lower in the students who still live in their parental household.

Although young adult students have a lower average annual income compared to employed young adults, the multivariate analysis shows that annual income positively correlates with car ownership. However, this relationship is only significant for annual incomes above €4,000. Indeed, a young adult student with an annual income above €10,000 were 2.6 times more likely to own a car compared to a student with an annual income below €2,000.

On another note, driving licence owning students with a migration background had a higher likelihood of owning a car compared to Dutch students. Students with a western migration background were 36 percent more likely to own a car than young adults without a migration background. Moreover, students with a non-western migration background were 96 percent more likely to own a car compared to students without a migration background. These results are in agreement with the descriptive statistics in chapter 3.

Logistic regression analysis young employed adults

In accordance to our findings amongst students, car ownership amongst employed young adults also increases with age. As is displayed in our model (Table 2), it appears that a 19-year-old employed young adult was 32 percent more likely to own a car compared to an 18-year-old employed young adult. Remarkably, a 29-year-old is 134 percent more likely to own a car than an 18-year-old.

Young employed adult females are 17 percent less likely to own a car compared to young employed adult men.

Furthermore, as was shown for students, the degree of urbanisation is also a factor of importance for car ownership among young employed adults. Young employed adults who live in very strongly urbanised areas were 72 percent less likely to own a car than those living in non-urbanised areas.

Young employed adults who live on their own were 57 percent less likely to own a car compared to young employed adults who live with their parents. This was not the result we expected to find. These findings also refute previous assumptions that young employed adults who live with their parents are less likely to own their own car. A possible explanation for this finding might be the increased financial burden of living on your own.

On another note, young employed adult parents of one or more children are 14 percent less likely to own a car compared to young employed adults without children who live with their parents. In addition, also for the employed group, car ownership is determined by the presence of another car within the household. When another car is present in the household, a young employed adult is 64 percent less likely to own a car.

Next, from the descriptive statistics it became evident that young employed adults with a western background have the highest probability of owning a car. However, the multivariate analysis revealed that individuals with a non-western migration background are actually more likely to own their own car, and that individuals with a western background are least likely to own a car. This discrepancy comes forth from the fact that the multivariate model analyses ethnicity by itself, while correcting for the other independent variables. Notably, as is shown in Table 3, stepwise regression analysis revealed that different independent variables contribute to different degrees to the determination of car ownership. These results show that ethnicity is the least contributing variable in the determination of car ownership among

3.3.2 Logistic regression for car ownership among young employed adults with a driving licence, 2015

	Coef.	Std. Error	Odds	Significance*
Age	Reference			
18 yrs				
19 yrs	0.274	0.039	1.315	yes
20 yrs	0.378	0.036	1.459	yes
21 yrs	0.434	0.036	1.544	yes
22 yrs	0.467	0.035	1.595	yes
23 yrs	0.532	0.035	1.702	yes
24 yrs	0.611	0.035	1.842	yes
25 yrs	0.680	0.035	1.974	yes
26 yrs	0.733	0.035	2.081	yes
27 yrs	0.773	0.035	2.166	yes
28 yrs	0.816	0.035	2.262	yes
29 yrs	0.849	0.035	2.338	yes
Gender				
Male				
Female	−0.188	0.004	0.829	yes
Degree of urbanisation				
Not urbanised				
Marginally urbanised	−0.116	0.008	0.890	yes
Moderately urbanised	−0.376	0.009	0.687	yes
Strongly urbanised	−0.562	0.008	0.570	yes
Very strongly urbanised	−1.280	0.009	0.278	yes
Household position				
Living with parents				
Single	−0.838	0.008	0.433	yes
Couple without children	−0.495	0.007	0.609	yes
Couple with children	−0.459	0.008	0.632	yes
Single parent	−0.154	0.027	0.857	yes
Other	−0.534	0.015	0.586	yes
Other car in household				
No				
yes	−1.013	0.006	0.363	yes
Income class (annual personal income)				
Below €4,000				
€4,000 -< €10,000	0.174	0.018	1.190	yes
€10,000 -< €20,000	0.860	0.017	2.362	yes
€20,000 -< €30,000	1.478	0.017	4.385	yes
€30,000 -< €40,000	1.594	0.017	4.923	yes
€40,000 or more	1.303	0.017	3.681	yes
Ethnicity				
Dutch				
Western migration background	−0.037	0.009	0.963	yes
Non-western migration background	0.090	0.007	1.094	yes

* p < 0,001

young employed adults. In addition, it is also important to note that as is shown in Table 2, all ethnicities have odds ratios relatively close to 1. Furthermore, the likelihood of having a car increases as the income of young employed adults increases. An individual with an annual

income between €10,000 and €20,000 is 1.4 times more likely to own a car compared to someone with an annual income below €4,000. Additionally, employed young adults with an annual income between €30,000 and €40,000 are almost 4 times more likely to own a car compared to someone who earns below €4,000 a year. By contrast, as individuals start to earn over €40,000 a year, they are only 2.7 times more likely to own a personal car compared to the group earning under €4,000. This might seem contradictory, however, this might be explained by the increased prevalence of lease contracts among individuals with higher salaries. Indeed, 40 percent of young employed adults of this highest income class that do not own a car, have the availability of a lease vehicle. This is a striking increase compared to the lowest income class, were only 2 percent of the group have a leased car to their availability.

Which variables contribute to car ownership the most?

To determine which variables have the highest contribution in the determination of car ownership likelihood we performed stepwise regression analysis for both driving licence-owning young adult students and young employed adults. As is shown in the results depicted in Table 3, income is the most determining variable for car ownership amongst students, followed by age and degree of urbanisation. Amongst young employed adults, degree of urbanisation has the highest contribution in the determination of car ownership likelihood, followed by income and the availability of another car within the household.

3.3.3 Characteristics that influence car ownership for students among employees (18 to 29 years) (ranked from most to least influential)

Students	Young employees
1. Income class	1. Degree of urbanisation
2. Age	2. Income class
3. Degree of urbanisation	3. Other car in household
4. Ethnicity	4. Position in household
5. Other car in household	5. Age
6. Position in household	6. Gender
7. Gender	7. Ethnicity

4. Discussion and conclusions

There clearly is a large difference in car ownership likelihood between young adults students and young employed adults. In our student group, 60 percent have a driving licence and 7 percent have a car, while this is 83 and 48 percent for young employed adults respectively. Although only a minority of young adult students own a car, the vast majority own a driving licence, indicating that students are well-prepared for future car use.

Furthermore, the multivariate analysis revealed that the investigated variables (age, sex, degree of urbanisation, place in household, the availability of another car in the household, income, migration background) have effects on car ownership for both you adult students

and young employed adults with a driving licence. Their degree of contribution varies, however. Among young adult students the most contributing variable was income, followed by age, while in the young employed adult group degree of urbanisation and income were most contributing.

As discussed, income is the most important factor for the determination of car ownership for students, income positively correlates with increased likelihood of car ownership (for annual incomes of €4,000 and up). The same holds true for the employed group, although car ownership likelihood seems to decline among the group with the highest income. However, this is clearly due to the increased prevalence of lease contracts within this group.

For students, age is the second most important contributing factor for car ownership. As expected, older students are more likely to own a car compared to younger students. Strikingly, 29-year-old students are almost 5 times more likely to own a car compared to 18-year-old students. Within the employed group, age is also a strong positive predictive variable. However, the most important predictor for car ownership in the employed group is degree of urbanisation, as individuals living in the most urbanised areas are almost 75 percent less likely to own a car compared to ones living in non-urbanised areas. This negative effect of degree of urbanisation is also detected among students, while in this group, car ownership is lowest among the individuals living in the least urbanised areas.

In addition to the aforementioned variables, it also became apparent that the availability of another car within the household also plays an important predictive role in car ownership of young adults. In both the student as in the employed population, the likelihood of owning a car was lower when a another car was present in the household. On the other hand, both students and employed individuals are more likely to own a car when they still live in their parental household. Strikingly, young employed adults who live on their own without a partner or children, are 57 percent less likely to own a car compared to young employed adults who live with their parents.

Furthermore, in contrast to our expectations, young employed adults with a non-western migration background are more likely to own a car compared to individuals without a migration background. Although ethnicity is a contributing factor, it is the least predictive variable for car ownership within the employed young adults population. Interestingly, within the young adult student population, individuals with either a non-western or a western migration background are more likely to own a car compared to individuals without a migration background. Lastly, males are more likely to own a car compared to females in both the student and the employed group.

It is important to note that there is possible interaction between the previously described variables. For example, it might be possible that a young adult chooses not to buy a car because he or she lives in a strongly urbanised area, however, it might also be possible that young adults who do not desire a car are more likely to move to a more urbanised area where public transport and facilities are generally closer by. These interconnections were not further investigated.

Suggestions for future research

This investigation was conducted using data from the year 2014 and the start of 2015. Since then, new developments have taken place. In early 2017, car ownership among young adults between the age of 18 to 29 has increased. In addition, the economy is improving and unemployment rates are decreasing (CBS, 2017d). On the other hand, financial support for students changed in September 2015. First-year students with parents on an annual income above €30,000 no longer receive financial support from the government, and when financial support is granted, this is no longer a gift, but a loan. These measures resulted in decreased registration rates in university cities in 2015 (Statistics Netherlands, 2015c). These changes directly influence student income and thereby car ownership likelihood.

In this paper, we investigated the influence of several background characteristics on the likelihood of owning a car at a single moment in time. In the life of a young adult, many important choices are made that can have profound effects on current and future car ownership. So-called "life events" such as moving in with a partner, relocation, a new job or getting children can possibly influence the purchase, replacement or the sale of a car. Therefore, in future research endeavours, it would be interesting to investigate changes over a longer time span. In addition, cohort analysis may reveal when and on what level the currently described variables might change car ownership likelihood.

Also, here we investigated a number of variables and their relation to car ownership. It is very likely that other factors which were not included in the current paper, such as education, distance to work, or even harder to quantify factors such as sociocultural status effects of owning a car, do have profound effects on car ownership levels.

Furthermore, here we primarily investigated the personal ownership of a car, and not the use of the vehicle. Future research could further investigate the actual use of a car for the young adult population. After all, it is very likely that young adults do not own a car themselves but use a car owned by their partner or their parents. This could also be compared to the ownership and use of other methods of transport. Do young adults who do not use a car make use of a motorcycle, a moped or a bike instead?

In addition, it would also be interesting to repeat the current investigation in a group of young adults that were not included in this investigation (the NEETs, see description in Chapter 2) or for different age groups. Are the same variables of importance to car ownership of people aged 30 or older? Or do other aspects such as health play a more prominent role?

In conclusion, it appears that degree of urbanisation is a very relevant factor in car ownership. However, whether this is due to better public transport, the accessibility of public facilities, traffic or parking costs is still undetermined. A separate investigation focusing on these different elements that are characteristic for more urbanised areas could provide more insights in this matter.

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Explanation of figures

Empty cell	Figure not applicable
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*	Provisional figure
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2017–2018	2017 to 2018 inclusive
2017/2018	Average for 2017 to 2018 inclusive
2017/'18	Crop year, financial year, school year, etc., beginning in 2017 and ending in 2018
2015/'16–2017/'18	Crop year, financial year, etc., 2015/'16 to 2017/'18 inclusive

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