

TO DRIVE OR NOT TO DRIVE

A Logical and Computational Analysis of European Transport Regulations

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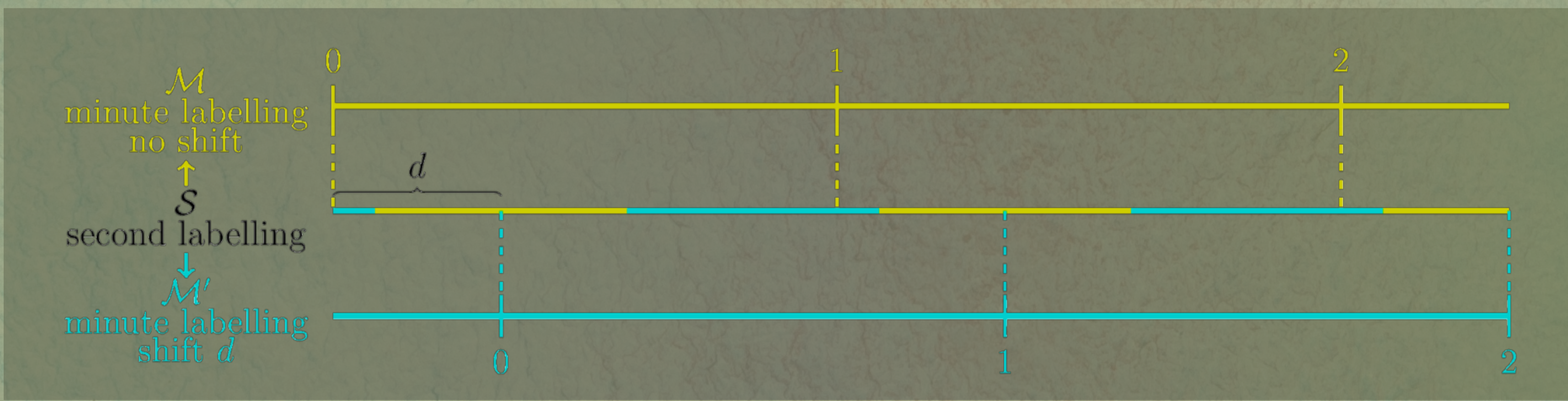
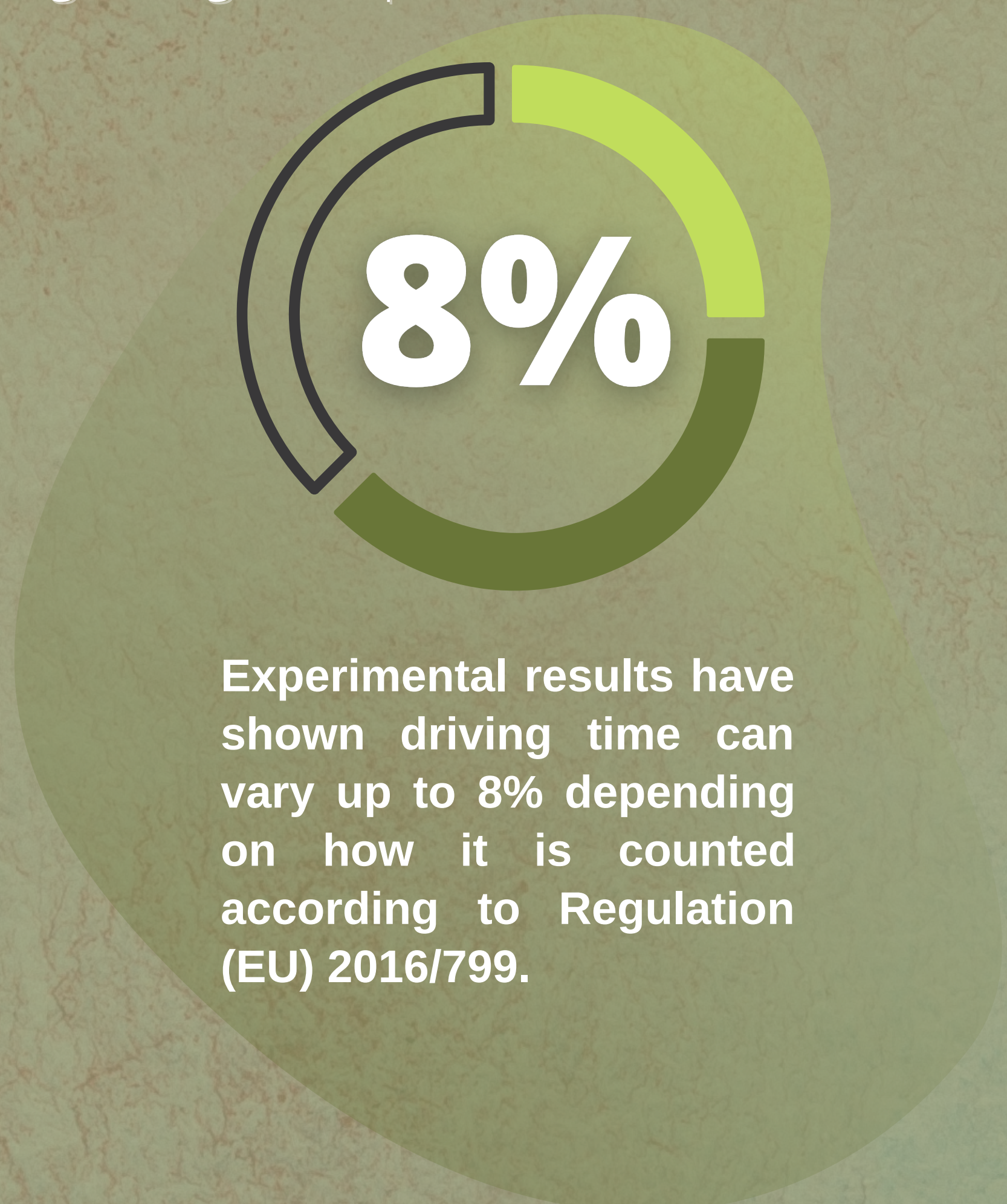
SUMMARY

A selection of articles from European transport regulations contain algorithmic information which may be problematic to implement. We focus on issues regarding the interpretation of tachograph data and requirements on weekly rest periods. We show that the interpretation of data prescribed by these regulations is sensitive to minor variations in input, such that near-identical driving patterns may be regarded both as lawful and as unlawful. We then show that the content of the regulation may be represented in monadic second-order logic, but argue that a more computationally tame fragment would be preferable for applications. We consider its representation in linear temporal logic, but show that a representation of the legislation requires formulas of unfeasible complexity, if at all possible.

RESULTS

Easily overlooked subtleties in the law can and do produce drastic changes in the output, possibly making a legal sequence of activities appear to be illegal.

Due to the interdependence between Requirements (51) and (52) of Regulation (EU) 2016/799, for any two different time standards, there exists a labelling of second activities such that under one time standard all minutes would be labelled as driving minutes while under the other labelling they would all be labelled as resting minutes. Real-world data exhibit differences up to 8% in driving time.



A differing labelling S give rise to two different minute labellings depending on whether or not a shift d is applied. The color in the middle line indicates that the second labelling matches with the minute labelling of the respective minute of the same color. (Fig. 7, p. 11)

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