



**To:** Place Directorate

**From:** Adrian Davis

**Date:** 17/07/14

**Subject:** Essential Evidence on a page: No 124 Acceptable utility walking distance

---

Top line: A walking distance of approximately a quarter of a mile is normally used as an estimate of willingness to walk when planning pedestrian-related infrastructure. However, an energy expenditure-based approach may be more helpful when considering characteristics for setting walking distance. Acceptable walking distance may be greater where the pedestrian environmental quality is perceived to be higher.

There are variations in walking distance across pedestrian environments, yet there is scant empirical literature on the subject. In a 2014 study researchers sought to provide some new evidence relating to the acceptability of walking based on an energy expenditure approach.<sup>1</sup> The estimate of walking distance serves as an accessibility indicator for evaluating whether or not people decide to walk to a planned facility. This was launched by Howard in 1902, who used an acceptable walking distance to determine a reasonable town size. Perry, in 1929, introduced the 'neighbourhood unit' idea with emphasis on walking accessibility, and with residences arranged around a service centre within an acceptable distance. To date, new planning paradigms—for example, public transport oriented development, new urbanism, and the compact city—continue to apply walking distance not only to create a pedestrian-friendly environment but also to reduce greenhouse gas emissions by encouraging transit ridership and walking frequency. However, the characteristics of the pedestrian (e.g., trip purpose, gender, and age) and urban context may alter perceived acceptable distances.

There appears to be some general agreement that the higher the pedestrian environment quality (PEQ) the farther, within reason, people are willing to walk (accounting for weather), and this finding is supported by research. Lövmemark, in 1972, recognized the effects of PEQ on willingness to walk and claims that a pleasant pedestrian environment encourages an increase in walking distance of up to 30%. Using the concept of walking energy expenditure (WEE) where the level of WEE represents the level of effort expended during walking, the researchers assumed that the greater the effort required by the pedestrian to walk, the shorter the distance they are willing to walk. The researchers used heart rate to measure energy expenditure. Thus, the distance that a certain proportion of pedestrians are willing to walk was estimated.

As the terrain factor needed to be redefined for urban street space an experiment was conducted in seven streets. The trend of commuting WEE in the urban area of Taipei compared with the traditional distance of a quarter mile (about 402 m) was greater, the expected walking distance in the study ranging between 505 m and 1113 m. The experiment showed that a higher PEQ slowed down the heart rate during walking. Positive attributes of a street (such as comfort, safety, and other pleasant feelings) were validated as the sources for lowering heart rate compared with the negative effects (such as danger, discomfort, and darkness) that raise it. There may also be some positive experiences which were not pre-considered in the experiment which could also contribute to a higher heart rate, such as excitement, anticipation, and pleasant surprises.

---

<sup>1</sup> Chaug-Ing, H., Yau-Ching, T. 2014 An energy expenditure approach for estimating walking distance, *Environment and Planning B: Planning and Design*, 41: 289-306.