The loss of rural facilities

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Chapter 5

Aversion to loss of place
The endowment effect for local facilities

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Abstract

Facility-decline is often met with community responses including protective behaviour. These reactions to place-change are preceded by the conscious and unconscious valuation of public places as communal assets and subsequent negative evaluation of closure. Previous studies show that closure of local facilities can be perceived as a loss to the community. However, a gap in place-based research in geography and environmental psychology is the lack of attention to psychological biases, such the endowment effect, that could influence in the perceived loss of facilities because people attach more value to something they are used to 'having'. This paper uses insights from prospect theory as a reference point to theorise the socio-psychological process of dealing with place-change caused by the closure of local facilities. Analysis of a survey conducted in the Province of Fryslân, Netherlands, shows that positive subjective valuation of eight local facilities, as well as negative evaluation of closure, is influenced by the current availability and the social function of this facility in the neighbourhood. The results indicate that the endowment effect exists in the context of facility decline. This paper hopes to ignite a discussion, and to stimulate further research into the effect of psychological biases on place-based behaviour. Moreover, since previous studies show that a perceived sense of ownership and emotional and cognitive bonds can lead to endowment effects in other context, this study paves the way for research into the relationship between collective psychological ownership, place attachment, the endowment effect and overall aversion to loss of place.

Key words: endowment effect; place change; facilities; place attachment; prospect theory; loss aversion.

5.1 Introduction

Despite processes of globalisation and individualisation, local facilities remain important places for community life and social interaction (Woods, 2007). This holds true for both urban and rural areas, but especially in rural areas the closure of a local shop, school, library or sports facility is often met with place protective behaviour such as protests or community action (Kłoczko-Gajewska, 2020). The impact of facility-decline in rural areas is partly due to fewer alternatives being available (Christiaanse, 2020), but the negative evaluation of facility decline is more often due to the social, symbolic and emotional meaning that local facilities can have in a rural community (Christiaanse and Haartsen, 2017, 2020). While we mostly see stories in the media about rural communities protesting facility-decline, an iconic café in a close-knit urban neighbourhood can be just as important to the community (Finlay *et al.,* 2019). Negative evaluation of the closure of local facilities can also partly be due to the disruption of communal and personal place-bonds (Christiaanse and Haartsen, 2017), and there can be a strong sense of loss with regard to facilities that were perceived as collective assets to the community (Christiaanse and Haartsen, 2020). Local governments often struggle to deal with sentiments of loss, when policy and spatial planning strategies assume people make rational decisions (Strauss, 2008). However, we believe that aversion to loss of place might be partly caused by a psychological bias in which the subjective value of local facilities changes when people "focus on the foregone" (Smitizsky, Liu and Gneezy, 2021). In this paper we therefore introduce the concept *endowment effect* to explore if this may partly explain senses of loss for (potential) facility closures.

This paper examines if the endowment effect can (partly) explain the prevalent negative perception of facility-decline. The endowment effect refers to a tendency to value goods more once they are owned, because once owned, people start to consider the pain of losing them (Thaler, 1980). The endowment effect is often used interchangeably with *loss aversion* which refers to a behavioural response to loss (Kahneman, Knetsch and Thaler, 1991). There is an overwhelming amount of literature on both loss aversion and the endowment effect, but while this psychological bias could influence the perception of various forms of place-change, it is strangely overlooked in our field. This paper aims to address this gap. However, operationalising loss aversion in a spatial context is challenging because people do not often have any real decision power over the 'loss' of a place. The premise of this paper is

that if an endowment effect-influences how local facilities are valued and how closure is evaluated, this can contribute to an aversion to loss of place. We therefore choose to focus on the endowment effect and operationalise it in a novel way. The hypothesis is that perceived value of local facilities increases once people are accustomed to these places being available, and that this endowment effect subsequently influences the evaluation of closure. We build on the knowledge that especially in rural areas local facilities are the places where community life takes place, and there can be collective psychological ownership over certain local facilities (Christiaanse and Haartsen, 2020) in the sense that community-members feel these places 'belong to us' (Pierce and Jussila, 2010).

We use data of a survey on the topic of 'liveability' conducted in the Province of Fryslân in 2018, Netherlands (N= 1790). We first explore if subjective valuation of eight local facilities is related to the (lack of) availability of facilities in people's village or neighbourhood. Secondly, we will investigate if this endowment effect holds up when controlling for other variables that can influence positive valuation of local facilities. Thirdly we examine if negative *evaluation* of (potential) closure is influenced by (current) availability, while controlling for the same variables. Indicating how the endowment effect influences the perception of place-change. This paper offers a conceptual advance in the field of environmental psychology and human geography, by introducing the endowment effect to better understand perceptions of facility decline and other forms of perceived 'loss of place' after social, cultural, economic, environmental and/or spatial changes occur. This study aims contribute to a better understanding of perceptions of place-change and subsequent place-protective (loss aversive) behaviour, and ignite new directions for future research on possible drivers and conditions of the endowment effect.

5.2 Theory

The endowment effect and loss aversion

The endowment effect is traditionally measured by the same mechanisms as loss aversion, but they actually have different origin stories, and a slightly different conceptual focus. Loss aversion was first introduced by Kahneman and Tversky (1979) and it is a central concept in prospect theory, which aims to model people's real-life non-rational choices (Knobloch, Huijbregts and Mercure, 2019). Loss aversion refers to how changes for the worse (losses) have a larger influence on the decisions people make than changes for the better

(gains) (Kahneman, Knetsch and Thaler, 1991; Kahneman and Tversky 1979; Novemsky and Kahneman, 2005). The endowment effect was introduced by Richard Thaler in 1980, and is defined by 'subjective valuation' after ownership, whereas the definition of loss aversion is more behavioural. Both concepts were initially studied with tradeable goods such as pens and mugs, but have since been widely studied and applied to many different topics.

There is an ongoing debate about the relationship between loss aversion and the endowment effect. Traditionally, it is believed that a psychological preference for the status quo (reference dependence), together with loss aversion gives rise to the 'endowment effect' (Kahneman, Knetsch and Thaler, 1991; Morewedge and Giblin, 2015). Recent studies show that the endowment effect can also be explained by emotional attachment and cognitive perspective (Ariely, Huber, and Wertenbroch, 2005), ownership effect (Morewedge et al., 2009) or inertia (Gal, 2006). Morewedge (2021) actually states that affective attachment and cognitive extension as the self, likely leads to psychological ownership (PO) of the object, which could in turn lead to an endowment effect. While loss aversion is still the leading paradigm for understanding the endowment effect (Marzilli Ericson and Fuster, 2014) we choose to focus on the latter because people often don't have any real power over 'deciding' the fate of local facilities. We expect that people endowed with certain local facilities in the community are averse to losing them, because they value these facilities more compared to communities who never 'had' them to begin with.

Operationalising the endowment effect for loss of place

While prospect theory is mainstream in behavioural economics, it is not commonly applied in fields of human geography or environmental psychology (Strauss, 2008). The endowment effect is therefore not operationalised yet to study *places* instead of tangible goods. Both the endowment effect and loss aversion were traditionally measured using the same choice experiments for tradable goods (Morewedge and Giblin, 2015). Under the valuation paradigm participants were asked their willingness to pay (WTP) money to acquire a good or willingness to accept (WTA) money to part with this good (Kahneman and Tversky 1979; Kahneman, Knetsch and Thaler, 1991). The same examples often also work for what Samuelson and Zeckhauser (1988) call the 'status quo bias', which is a preference for things to stay the same in relation to a reference point. Early studies used experiments with participants that were sellers and buyers of coffee mugs, pens and chocolate bars (Kahneman,

Knetch and Thaler 1990; Knetsch 1989). Later studies show that there is no loss aversion in routine transactions (Novemsky and Kahneman, 2005) for mundane good, unless there is an *affective attachment* (Smitizsky, Liu and Gneezy, 2021). We now also know that people can experience loss aversion for goods they never owned, but instead perceive or expect to own (Carmon, Wertenbroch, and Zeelenberg 2003; Dhar and Simonson 1992; Novemsky and Kahneman 2005). Since *psychological ownership* does not require legal ownership or factual possession (Ariely and Simonson, 2003; Pierce, Kostova, and Dirks 2001; Reb and Connolly, 2007), loss aversion can also hold true for public goods, which are 'non-excludable', meaning that it applies to things that cannot be purchased and people can use them parallel to others (Bischoff and Meckl, 2008). Public facilities and services can also be seen as public goods since they are part of our 'social infrastructure' (Latham and Layton, 2019).

The growing body of research on loss aversion and the endowment effect for public goods can help with the application of these concepts to place-based research. Some studies investigate intangible non-goods such as clean air (Clarke, Bell and Peterson, 1999; Cummings, Brookshire, and Schulze 1986), nature (Wang *et al.*, 2019) and time (Hoorens, Remmers, and Van De Riet 1999). Others look at loss aversion for the provision of health care services (Neuman and Neuman, 2008; Fernández *et al.*, 2021) or energy services (Nicolson, Huebner and Shipworth, 2017; Knobloch, Huijbregts and Mercure, 2019). A general observation is that these studies all find a reluctance to accept change. Eckles and Schaffner (2010) show how loss aversion influenced a lack of support for health care reform in the USA, and Nicolson *et al.* (2017) showed how people were averse to adapting smart time use of electricity tariffs. However, none of these studies consider the spatial aspects. This is important because local facilities do not just offer a service, they have secondary and social functions for the community (Christiaanse and Haartsen, 2017).

Holtorf (2015) argues that loss aversion is applicable in the realm of cultural heritage sites, but does not include empirical research. Empirical studies on loss aversion or the endowment effect for places include studies on: agricultural landscape (Hasund, Kataria and Lagerkvist, 2011), hiking trails (Lee and Moon, 2018), the housing market (Genesove and Mayer, 2001), rural homesteads (Liu *et al.*, 2021) and wetlands (Mao *et al.*, 2020). Most of these studies use field or lab experiments or surveys in which they measure 'value' with monetary formats (WTA/WTP), which might not actually reflect people's subjective and perceived value of a place (Smitizsky et al., 2021). The contingent valuation

method (CVM) is most popular to value non-market goods, eliciting stated preferences and willingness to pay to maintain public-goods via (experimental) surveys. Aabø (2005) recognizes the social value and non-use value of Norwegian public libraries, but still employs CVM and does not mention loss aversion or the endowment effect.

A potential explanation for the lack of studies that explore loss aversion or the endowment effect for (public) places, may be that it is difficult to objectively measure 'value' in a spatial context. Part of the issue with using monetary measurements such as WTA/WTP, is that in a capitalist paradigm 'value' is automatically created by the activities that are counted as 'productive', whereas subjective value is actually concerned with social relations (Andueza, 2020; Turner, 2008). We believe that this also holds true for place value. Value is 'something collectively made and remade' (Graeber, 2013) and it is embedded in the 'horizons of meaning' of human practical actions and relations (Andueza, 2020). For instance, Christiaanse and Haartsen (2017) found that 85% of residents of a village in the Netherlands experienced the closure of a local supermarket as (very) regrettable, but they did not do enough shopping there nor were they willing to pay enough to save the shop though crowd-funding. Regardless of their unwillingness to pay, they still perceived closure as a major loss for the village community.

We argue that WTA/WPT methods are not suitable for environmental amenities or local facilities and services, because it does not realistically reflect subjective value or the perception of losses or gains (Knetsch, 1990; McCarter, Rockmann and Northcraft, 2010). Unfortunately, there are very few studies that use a different approach to assess value and observe the endowment effect. Purrington and Zinn (2011) asked participants to consider a gain and loss scenario about mountain bike trails, and then state behavioural intentions for protective behaviours. However, they do not actually measure valuation of the trails but rather the importance of activity. Bordalo *et al.* (2012) provides a better explanation for the endowment effect based on 'salience', in the sense that the longer you own something the more you value certain attributes and they become more salient (important) to you. Similarly, the perception of how important it is to have certain facilities in the community, is inherently based on the social and symbolic meanings as well as functional attributes (Christiaanse and Haartsen, 2017).

To operationalise the endowment effect in a spatial context we propose a subjective conceptualisation of place value in line with Bordalo et al. (2012), in which there are two important aspects to consider: psychological ownership (Morewedge *et al.*, 2009) and emotional attachment or cognitive perspective (Ariely, Huber and Wertenbroch, 2005). To measure the endowment effect for local facilities, we assume places can be collectively owned by people, or at least be perceived as such. Research into psychological ownership of public goods shows us that for loss aversion to occur, legal ownership is not necessary (Carmon, Wertenbroch, and Zeelenberg 2003; Pierce, Kostova, and Dirks 2001), but *psychological* ownership is crucial (Reb and Connolly, 2007; Shu and Peck, 2011). For instance, Wang *et al*. (2019) showed that if individuals have psychological ownership of natural areas, they value them more. Perceived or expected ownership sets a reference point from which people consider change a gain or loss (Marzilli Ericson and Fuster, 2014; Novemsky and Kahneman, 2005). This can also hold true for local facilities.

Pierce, Kostova and Dirks (2003) define psychological ownership as the psychological state of an individual that considers something "mine", and Pierce and Jussila (2010) define collective psychological ownership as feeling a good or service is "ours". There are many studies that show collective psychological ownership of 'places' such as neighbourhoods (Verkuyten, Martinovic, 2017), countries (Nijs et al 2021), Hang-out places (Nijs et al 2022) and also non-material services (Morewedge et al, 2021). Christiaanse and Haartsen (2020) found a sense of collective ownership for local facilities with a social or symbolic value for the village community. Facilities such as the local café, grocery store, sports facilities or primary schools, were routinely referred to as "ours". The perceived availability of facilities within the community are in this sense more important that the accessibility of a certain service (Christiaanse and Haartsen, 2020). We therefore suggest to measure availability of facilities within a small geographical unit such as the village or neighbourhood.

We know that local facilities are valued on more aspects than mere functionality, and that various place bonds influence the meaning of a place and the perception of closure (Christiaanse and Haartsen, 2017). According to Shu and Peck (2011) and Morewedge (2021) both psychological ownership and affective and cognitive bonds are prerequisites for the endowment effect to occur, while others see psychological ownership of something more abstract as a job, as implicitly inherent to occupation and interlinked with self-identity and belongingness (Dawkins *et al.*, 2017). In a spatial context belongingness

can be translated into a *sense of place* which can be subdivided into the concepts of place attachment (affective bonds), place identity (cognitive bonds) and place dependence (conative bonds) (Jorgensen, 2010). In various contexts place bonds influence how people evaluate changes in their physical environment (Anton and Lawrence, 2016; Zwiers, Markantoni and Strijker, 2018) and the disruption of place bonds can lead to stress or anxiety (Fried, 2000) and a sense of loss (Cook *et al.*, 2007; Christiaanse and Haartsen, 2020).

Emotion also plays an important part in loss aversion (De Martino *et al.*, 2010; Lerner, Small, and Loewenstein, 2004; Novemsky and Kahneman, 2005). Attachment may actually be a mechanism that influences the reference points of what is considered a loss or gain (Marzilli Ericson and Fuster, 2014). However, this does not mean that when you measure place attachment, there is also necessarily an endowment effect. We therefore don't recommend Yan and Bao's (2018) use of prospect theory to analyse housing satisfaction by identifying the endowment effect "in the form of place attachment" among displaced residents. We suggest to focus on identifying the endowment effect by studying if the perceived importance (value) increases with availability of a facility in the village or neighbourhood, and use questions on personal characteristics, social context and place bonds as control variables.

Theoretical framework for the process of dealing with place-change

For the purpose of understanding the possible implications of an endowment effect for local facilities, we embed this study into a larger theoretical framework (see figure 5.1). In the field of environmental psychology there are many studies that investigate the psychology behind spatial behaviour (Ertz and Sarigöllü, 2019), and more specifically towards protective behaviour when place bonds are broken or threatened (Stedman, 2002; Carrus, Bonaiuto and Bonnes, 2005; Devine-Wright, 2013). According to some studies that apply prospect theory, psychological ownership improves emotional and cognitive bonds, and this can lead to loss aversive behaviours (Carmon and Ariely, 2000; Wang *et al.*, 2019). It is likely that the same mechanism can be applied to spatial contexts, and that when place-change poses a 'threat' the losses can loom larger than a similar gain, which influences place-protective behaviours. However, the relationship between place bonds and behaviour is not linear, and it is influenced by individual characteristics, culture and environment (Raymond, Kyttä and Stedman, 2017; Christiaanse and Haartsen, 2020). Similarly, loss aversion is also shaped by culture and environment (Maddux *et al.*, 2010; Wang, Rieger and Hens, 2017). The relationship between attitudes

and behaviour is illustrated in Christiaanse and Haartsen's (2020) 5-stage socio-psychological framework for a community's response to place change, which in turn is inspired by Devine-Wright (2009) and Mihaylov and Perkins (2014). The five stages include: (1) becoming aware (2) interpretation and (3) evaluation of an occurring or pending place change, (4) coping and (5) reaction to this change.

Loss aversion, the way it is traditionally conceptualised, refers to all the stages in the model. In this study we break this process down into pieces that are empirically measurable in this spatial context, and focus on stage one and three. For the first stage we hypothesize that valuation of local facilities is influenced by the perceived availability in the community. When residents are likely to value certain facilities more if they are used to 'having' them, this can be seen as an endowment effect. For the third stage we investigate if perceived availability also leads to negative evaluation of place-change (in this case potential closure of facilities). This indicates that the sense of loss that can result after facility-decline, is party influenced by the endowment effect. It is useful to consider the full framework when discussing the implications of this study and directions for future research in which prospect theory could help to understand loss of place. We theorize that an endowment effect might influence loss aversive behaviour such as protests or other place-protective behaviour. The first step in applying prospect theory to a spatial context is to indicate the existence of an endowment effect. This leads us to three hypotheses to be studied:

1. Subjective valuation of local facilities is related to the (lack of) availability of facilities in the village or neighbourhood, which indicates the existence of a spatial endowment effect.
2. This endowment effect holds up when controlling for other variables that can influence positive valuation of facilities, such as personal characteristics, social context or place bonds.
3. Subsequent negative evaluation of (potential) closure is also influenced by availability.

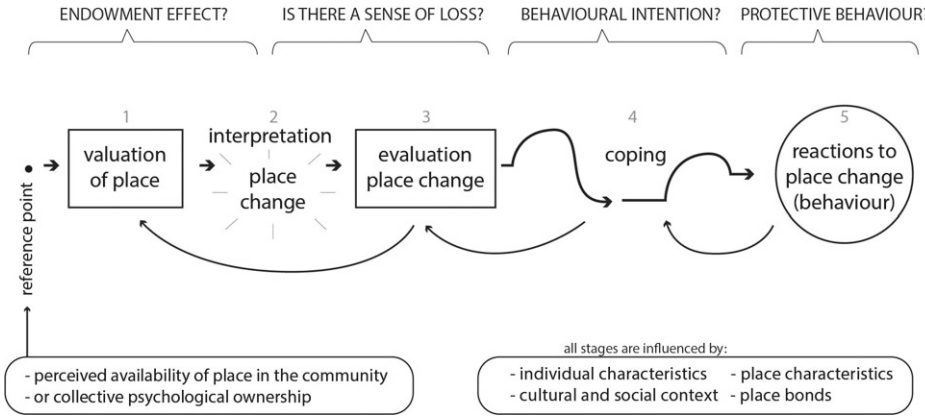

Figure 5.1: Theoretical Framework for dealing with loss of place

5.3 Materials and Methods

Data collection

For this paper we use data from a survey conducted by the Frisian Social Planning Agency (FSP) between April and May 2018. Fryslân is a province in the north of the Netherlands where, at the time, rural population decline was expected (Haartsen and Venhorst, 2010). See figure 1.3 on page 9. People living in the north of the Netherlands are more likely to lack a basic facility in their direct living environment compared to the national average (Steenbekkers and Vermeij, 2013). Compared to more international standards, however, basic facilities in Fryslân are relatively accessible and most of the time there are alternative options available close by (Christiaanse, 2020). Nevertheless, rural facility-decline is a source of concern in Fryslân and it is generally believed to negatively impact liveability (De Vries *et al.*, 2016). The survey-data was centred around the topic of liveability, which can be defined as the 'quality of the living environment based on physical and social dimensions' (Namazi-Rad *et al.*, 2016). The data was gathered by means of an online questionnaire among the 'Panel Fryslân', which is based on a random probability sample by written recruitment. The gross sample for this study was 3691 individuals, living in Fryslân, of 18 years or older. The response rate was 48% (n= 1790). See appendix C-5 for more details on the selection procedure.

The questions were drafted by the FSP apart from the three questions we were allowed to add on availability, value and evaluation of closure of eight local facilities: grocery store (in Dutch referred to as a supermarket); primary school;

general practitioner (GP); community centre; ATM; café (pub); sports facilities; church or other religious buildings. These eight facilities are often considered to be important for local residents in Fryslân to have 'in close proximity', meaning within 5 km (De Vries *et al.*, 2016) and are often perceived as 'assets to the community' (Christiaanse and Haartsen, 2020). Prospect theory suggests that gain, -and loss prospects are created by the comparison of possible benefits realized relative to a reference point (Kahneman and Tversky, 1979). When applying prospect theory to 'losing' local facilities, the reference point would be the 'availability' of a facility (yes, no closed). We phrased the question as *'Are the following facilities currently available in your village or neighbourhood?'* because this is a geographical scale that both rural and urban residents in the Netherlands can relate to, and one that can be understood as 'within the local community', in which psychological ownership is implied.

Subjective value was measured as *'How important or unimportant do you find the presence of the following facilities in your village or neighbourhood?'* on a 5-points Likert scale. Evaluation of *potential* (imagined) closure or *actual* closure of the eight facilities was questioned in a 5-points Likert scale from very regrettable to not regrettable at all. Participants were also asked if these facilities are 'places for social encounters' which is useful since the social importance of facilities adds to a sense of collective ownership. As control variables we used socio-demographic characteristics and questions on village/neighbourhood place attachment, place dependence, bonding and community involvement. These concepts are known to strengthen the endowment effect (Dawkins *et al.,* 2017; Pierce, Kostova and Dirks 2003; Wang *et al*., 2019) and are a better place-based proxy measure for ownership than Purrington and Zinn's (2011) use of centrality. See appendix C-1 for the survey questions and response categories that were used in this study.

Method of statistical analysis

To examine if the endowment effect can be a factor in perceptions of facility-decline, we first investigated the subjective *valuation* of local facilities in relation to the availability of such facilities. Next, we investigated if the endowment effect influenced the *evaluation* of the closure of facilities. In Dutch public discourse there is an ongoing discussion about which facilities are important to keep in local communities, especially in smaller rural villages. In this discussion some facilities are clearly perceived to be more important in smaller villages than in cities or towns. That is why first we conducted an exploratory descriptive analysis on the importance of local facilities, showing

differences for rural and urban areas (Table 1). We chose to not to split urban and rural areas in later analysis, since it did not result in sufficient cell counts. Instead we decided to control for urban and rural.

To explore the first research question, 'is there an endowment effect for local facilities', we set out to investigate if residents significantly value local facilities more based on the reference point of: current availability, 'loss' due to closure, and 'never having had them' within the neighbourhood or village. We analysed this by conducting a pearsons chi square test on 'availability' (yes, no, not any more) and 'importance' (ranging from very unimportant to very important on a five points scale) for eight local facilities (see table 2). We had to combine very unimportant with unimportant, to achieve a sufficient cell count, resulting in four categories: (very) unimportant, neutral, important and very important. After we established a significant relationship between subjective valuation and availability, we set out to investigate if this relationship is not explained by other factors.

For the second research question, we explored to what extent positive valuation of each facility is affected by the 'availability' within the neighbourhood/village, controlling for other explanatory variables and individual characteristics. We analysed this by conducting eight binary logistic regressions to investigate which variables influence a positive valuation of each facility[5]. We analysed the effect of availability on the probability that a given case (person) 'finds this facility important' (positive valuation) relative to 'unimportant or neutral' to have in the village or neighbourhood. We controlled for age, gender, work status, education level, having children living at home, length of residence and rural or urban status. Since valuation of an object increases with length of ownership (Strahilevitz and Loewenstein, 1998), length of residence might increase the valuation of local facilities (Haartsen and Gieling, 2021). Having children living at home could influence valuation of local primary schools and it is likely that education level, work status, gender and age also influences which and how local facilities are valued. We also added a variable on the functioning of this facility as a 'meeting place' because local facilities can have a social value for a community. In addition to these explanatory variables we also use four questions on local place attachment, bonding, involvement and dependency,

5 We considered (and tried) an ordinal regression model, which yielded similar results, but this did not comply with the test of parallel lines. However, to indicate the endowment effect we do not necessarily need to indicate the *level* of valuation, but a significant likelihood of a positive valuation (dependent variable: importance) of a local facility based on availability.

because these are likely to influence the endowment effect (Dawkins *et al.*, 2017; Pierce, Kostova and Dirks 2003; Wang *et al.*, 2019). Because some of the variables we use are known to correlate (Gustafson, 2001), we checked for correlations between the independent variables with spearman rank-order correlation analysis (all r > 0.5). See appendix C-2 for sample statistics and appendix C-3 for more detailed information on the logistic regressions.

To explore the third research question, we investigated if (current) availability also influences how participants evaluate the potential loss (imagined closure) of local facilities, while controlling for the same variables. We conducted another set of eight logistic regression analysis, presented in table 4, to investigate which variable influence negative evaluation (DV) of imagined closure. We use 'current' availability as an explanatory variable and 'closed' as a reference category, since imagined closure is often evaluated more negatively than actual closure (see appendix C-4)[6]. Walker *et al.* (2015) explain that in a context where people feel entitled to a certain quality of their living environment, and perceive changes as unfair, the reference point for 'relative deprivation' is usually an *imagined* alternative outcome.

5.4 Results

The endowment effect for local facilities

Before we investigate whether the endowment effect influences perceptions of facility-decline, it is worth to quickly explore the differences in how local facilities are valued in urban neighbourhoods compared to rural neighbourhoods. We used two categories available in the dataset: participants living in a settlement with less than 5000 inhabitants are labelled 'rural' and with more than 5000 inhabitants 'urban', in line with De Vries *et al*. (2016). Table 1 shows the percentage of participants that found these facilities to be 'important' or 'very important' to have in their village or neighbourhood. Overall, local facilities for basic needs like food, health care and education are in the top three of most important facilities. There are some differences between which facilities are believed to be (very) important in urban and rural areas. In rural areas community centres are valued more and in urban areas

6 We also conducted a set of Pearson's chi square analyses cross-tabulating availability and evaluation of closure for all eight local facilities. While these results give insight into the difference in evaluation of potential closure and actual closure, not all the models met the assumptions. We added the table for reference in appendix C-4.

the automated teller machine (ATM) are valued more. The church and café are valued least regardless of the settlement size.

Table 1: The subjective value of local facilities, based on the % of participants that found availability in the neighbourhood or village to be (very) important

	all respondents		**Rural** *(<5000 inhabitants)*		**Urban** *(>5000 inhabitants)*	
	Friesland	n=1790		n=907		n=883
1	grocery store	83%	school	83%	grocery store	94%
2	school	81%	Comm.centre	78%	GP	86%
3	GP	79%	grocery store	73%	ATM	82%
4	ATM	75%	GP	73%	School	78%
5	Comm.centre	66%	sports	72%	Sports	55%
6	sports	64%	ATM	69%	Comm.centre	53%
7	Religious facility	36%	café	43%	Religious facility	31%
8	café	35%	Religious facility	42%	café	27%

Table 2 presents subjective value based on how important the eight local facilities were deemed within three categories of availability: currently available, closed, has never been available during time of residence. A chi square analysis was conducted for all eight facilities: grocery stores, GP's, ATM's, sports facilities, primary schools, cafés, community centres and churches or other religious facilities. The results show that residents that are endowed with these local facilities in their village or neighbourhood, consistently value them more than residents that don't have them. Residents that never 'had' these facilities to begin with are more inclined to find it unimportant or neutral to have these facilities in their village or neighbourhood. It also seems that for some facilities subjective value is tempered after closure, since residents that currently 'have' a grocery store, ATM, sports facility, café or religious facility in their village/ neighbourhood found availability more important than residents that *used* to have one. The differences between the expected and observed subjective value are significant for all eight facilities. This all implies the existence of the endowment effect. Grocery store, GP and ATM have the highest Cramers V, indicating a stronger (endowment) effect. Nevertheless, to further investigate how strong the effect of the endowment is compared to other variables that influence a positive valuation of local facilities, we will now discuss the results of a set of logistic regressions.

Table 2: Subjective value versus availability of local facilities, per type of local facility

Availability of [facility] in village/ neighbourhood?	**How (un)important is the presence of [facility x]** in your village/neighbourhood? *% within availability*						
	(very) un-important	neutral	important	very important	Chi-Square	Cra-mers V	n
1 Grocery Store					X2= 692,	0,44	1789
Yes	2 %	3 %	48 %	48 %	df=6,		
no, closed	20 %	33 %	37 %	11 %	p<0.001		
no, has never been here	35 %	24 %	35 %	6 %			
2 General Practitioner					X2= 657,	0,43	1754
Yes	1 %	5 %	39 %	54 %	df=6,		
no, closed	11 %	35 %	40 %	14 %	p<0.001		
no, has never been here	23 %	37 %	35 %	6 %			
3 ATM					X2= 493,	0,37	1766
yes	3 %	9 %	51 %	38 %	df=6,		
no, closed	8 %	24 %	44 %	24 %	p<0.001		
no, has never been here	32 %	29 %	32 %	7 %			
4 Sports Facility					X2 = 300,	0,30	1726
yes	7 %	20 %	50 %	23 %	df=6,		
no, closed	27 %	42 %	31 %	0 %	p<0.001		
no, has never been here	35 %	43 %	20 %	3 %			
5 Primary School					X2 = 249,	0,27	1765
yes	4 %	11 %	44 %	41 %	df=6,		
no, closed	18 %	24 %	47 %	12 %	p<0.001		
no, has never been here	32 %	42 %	23 %	3 %			
6 Cafe					X2 = 189,	0,23	1724
yes	21 %	36 %	33 %	11 %	df=6,		
no, closed	30 %	36 %	29 %	5 %	p<0.001		
no, has never been here	52 %	38 %	8 %	2 %			
7 Community Centre					X2 = 113,	0,18	1703
yes	5 %	24 %	50 %	21 %	df=6,		
no, closed	7 %	26 %	35 %	33 %	p<0.001		
no, has never been here	20 %	37 %	40 %	3 %			
8 Church/religious facility					X2 = 78,	0,15	1751
yes	29 %	30 %	27 %	13 %	df=6,		
no, closed	38 %	43 %	16 %	3 %	p<0.001		
no, has never been here	53 %	38 %	8 %	1 %			

Table row percentages do not sum to 100% due to rounding.

Exploring the endowment effect

To further investigate which variables significantly influence positive valuation of local facilities, we conducted a set of eight binary logistic regression models, one for each facility. Table 3 shows the results of the logistic regressions on

finding it (very) important that a certain local facility is available in the village or neighbourhood. The results indicate that there is an endowment effect for subjective valuation of local facilities**,** since availability is a highly significant predictor compared to other variables. While the significance of the other predictors varies, the social 'meeting place' function also consistently predicts positive valuation for all eight facilities. All eight regression models have a good model fit (Nagelkerke R2), are significant at the .01 level according to the Model chi-square statistic, and predict minimally 75% of the responses correctly. We will now discuss the main predictors for subjective valuation.

The *availability* of facilities in the neighbourhood or village is a significant predictor for positive valuation for all eight facilities. Table 3 shows that relative to the reference category ("no, has closed") current availability (1: "yes") is a positive significant predictor for finding five out of eight facilities important. The opposite effect is evident for being used to not having them (2:"no, never been here"), which has a significant and negative coefficient in four out of eight models. The facilities with the highest odds ratio for 'availability' are the GP (11.3) and grocery store (10.6). This suggests that when participants currently have this facility in their village or neighbourhood, they are 11 times more likely to value them as important, compared to respondents who have lost these facilities. People that are currently endowed with sports facilities are 5 times more likely to find it (very) important to have this facility in the village or neighbourhood, and for ATM's and primary schools this is 4 times more likely, all relative to those who lost the facility in their vicinity. The results also show that when people are used to *not* having GP, ATM, Primary School and Café, they are more likely to value presence as (very) unimportant or neutral. These results are in line with expectations based on the endowment effect.

The *social function* of facilities as a meeting place is a significant predictor for positive valuation for all eight facilities. The odds ratio is strongest for churches or other religious facilities (OR 10); then sports facilities and café (OR6); ATM (OR5); community centre, primary school and grocery store (OR4) and smallest for importance of the GP (OR2). Moreover, for many local facilities it matters if people live in a more rural or urban environment. People in urban areas are two times more likely to find it important to have a grocery store in their neighbourhood, but only half as likely to find the availability of a local sports facility important. Primary schools, café's and community centres are also less important to urban residents. This could be because in urban areas more alternatives are available, and secondary (social) functions of these facilities

might be less important. Another results that stands out is how value of the GP and community centre increases with age of the participants. For primary schools and café's, the odds of finding it important increases with 2% for every year that a participant lives in their current place of residence. This might be related to emotional attachment to places which increases over the years (Bernardo, Bernardo and Palma-Oliveira, 2013), or simply because length of perceived ownership influences valuation (Morewedge and Giblin, 2015). Women are more likely to value community centres and religious facilities and people with children living at home value the presence of a primary school. People that feel less of a bond with their village or neighbourhood also value café's and community centre's less. People with high levels of mobility value café's and sport facilities less, likely because they can easily use facilities outside of their village or neighbourhood.

Table 3: Logistic regressions on the subjective valuation (importance) of 8 local facilities

DV=subjective value of the following facilities: *0: (very) unimportant or neutral,* *1: (very) important*	**Grocery** n= 1737		**GP** n= 1702		**ATM** n= 1714		**Sports** n= 1674		**School** n= 1715		**Cafe** n= 1673		**Comm.C** n= 1656		**Church/rel.** n= 1700	
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
Availability [facility] in village/ neighbourhood		***		***		***		***		***		***		***		***
1: yes	10,60	***	11,31	***	3,61	***	5,238	***	3,93	***	1,41		1,09		2,01	
2: no, has never been here	0,76		0,52	**	0,29	***	0,786		0,26	***	0,33	***	0,52		0,45	
3: no, has closed (reference)																
[facility] is a meeting place (0=no, 1=yes)	3,77	***	2,15	**	5,17	***	6,043	***	4,16	***	5,67	***	4,32	***	10,04	***
Age in years (ratio)	0,99		1,02	**	1,01		0,996		1,02		0,99		1,02	**	1,01	
Length of residence (ratio)	1,01		0,99		1,01		1,002		1,01	***	1,01	**	1,01		1,00	
Gender (0: male, 1: female)	1,27		1,14		1,30		1,061		1,07		1,00		1,57	***	1,30	**
Urban or rural (1:rural, 2: urban =>5000 people)	1,99	***	1,02		0,99		0,549	***	0,64	***	0,72	**	0,46	***	0,88	
Work, no work, retired																
1: working	1,01		0,64	**	0,78		1,014		0,97		1,23		1,04		1,09	
2: not working	1,20		0,69		1,32		1		1,07		0,94		1,08		1,15	
3: retired (reference)																
Are there children living at home? (0:no, 1: yes)	1,23		1,63		1,51		1,13		2,58	***	1,41		1,17		1,19	

Table 3: (continued)

DV=subjective value of the following facilities: *0: (very) unimportant or neutral, 1: (very) important*	**Grocery** n= 1737		**GP** n= 1702		**ATM** n= 1714		**Sports** n= 1674		**School** n= 1715		**Cafe** n= 1673		**Comm.C** n= 1656		**Church/rel.** n= 1700	
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
Highest completed education		***														**
1: low	0,42	***	1,18		0,81		0,936		0,88		1,04		1,30		1,57	**
2: middle	0,76		0,94		1,09		0,966		0,71	**	1,07		1,14		1,50	***
3: high (reference)																
I feel at home in this village/ neighbourhood (V/N)																
1: disagree (very much)	0,76		0,67		2,46	**	0,78		0,70		2,20	**	1,59		0,82	
2: neutral	1,25		1,27		1,31		0,934		0,92		1,05		0,89		0,94	
3: agree	1,13		1,32		1,34		1,267		1,35		1,20		1,30		1,25	
4: agree very much (reference)																
I am actively involved in my V/N												**		***		***
1: disagree very much	1,68		1,91		2,09		0,834		0,92		1,18		0,49		0,69	
2: disagree	2,88	**	1,11		1,62		0,536		1,10		0,76		0,52		0,74	
3: neutral	2,12		0,82		1,32		0,599		1,02		0,97		0,55		0,95	
4: agree	2,21	**	1,14		1,64		0,842		1,38		1,40		1,01		1,73	
5: agree very much (reference)																

Table 3: (continued)

DV=subjective value of the following facilities:	**Grocery** n= 1737		**GP** n= 1702		**ATM** n= 1714		**Sports** n= 1674		**School** n= 1715		**Cafe** n= 1673		**Comm.C** n= 1656		**Church/rel.** n= 1700	
0: (very) unimportant or neutral, 1: (very) important																
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
How often do you come outside place of residence								**								
1: > 6 times a week	0,78		1,24		1,25		0,529	***	0,69		0,57	**	0,90		0,99	
2: 3-5 times a week	0,96		0,89		1,07		0,788		0,94		0,95		0,84		1,25	
3: 1-2 time a week	0,74		1,06		1,07		0,945		0,84		0,88		1,05		1,13	
4: < 1 time a week (reference)																
Do you feel connected/bonded to your V/N								**						***		
1: not connected (at all)	0,88		0,99		0,74		1,05		0,62		0,44	**	0,53		0,79	
2: neutral	0,90		1,02		0,81		0,825		0,69		0,70		0,42	***	0,74	
3: connected	1,14		1,10		0,98		1,303		1,03		0,90		0,75		0,82	
4: very connected (reference)																
Constant	0,22		0,34		0,54		1,012		0,47		1,04		1,64		0,04	***
Model X2, df=24, p< 0.01	X2= 607,659		X2= 544,733		X2= 427,729		X2= 555,565		X2= 321,877		X2= 476,979		X2= 409,654		X2= 588,273	
Nagelkerke R2	0,493		0,432		0,329		0,388		0,274		0,340		0,305		0,399	
Hosmer & Lemeshow test	p = 0,753		p = 0,437		p = 0,407		p = 0,200		p = 0,112		p = 0,229		p = 0,709		p = 0,175	
Classification accuracy overall	88%		85%		81,2%		78%		84%		75%		75%		89%	

** significant for p< 0.05 *** significant for p< 0.01
DV = 'How (un)important is to have a [facility] in your village/neighbourhood?'
Availability [facility] was asked during time of residence, and 'I don't know' was coded as missing variables

Exploring negative evaluation of (potential) closure

To explore the third research question, we conducted another set of logistic regression analysis. Table 4 shows that current availability of five facilities is a significant predictor for negative evaluation of (potential) closure. The control variable of the facility being perceived as a social 'meeting place' also often comes out as significant predictor. The models are significant for all eight facilities, and have a good model fit (Nagelkerke R2). All eight regression models are significant at the .01 level according to the Model chi-square statistic, and predict a *minimum* 67,5% of the responses correctly. Current availability (closed is reference category) is a significant predictor for grocery stores (OR 12,2), GP (OR 13,4), ATM (OR 2,4), primary schools (OR 3) and religious facilities (OR 9,9). The social 'meeting place' function of grocery stores, sports facilities, primary schools, café's, community centres and religious facilities is also a significant predictor in these models. While some other variables also predict negative evaluation of (potential) closure, they are not as strong as the aforementioned social function or current availability. It is likely that imagining *potential* closure of local facilities is evaluated negative by more people than actual *experienced* closure. Unfortunately, the exploration of a set of Pearson's chi square analyses cross-tabulating availability and evaluation of closure did not meet the model-assumptions for all eight local facilities (see appendix C-4). Nevertheless, these analyses reinforce the findings of the last analysis, and indicate that people are more averse to losing the facilities they currently have.

Table 4: Logistic regressions on 'evaluation of (potential) closure' of 8 local facilities

Dependent Variable, evaluation closure	**Grocery n= 1421**		**GP n= 1247**		**ATM n= 1267**		**Sports n= 1379**		**School n= 1505**		**Cafe n= 1224**		**Comm C. n= 1397**		**Church/rel. n= 1467**	
0: not (very) regrettable/neutral, 1: (very) regrettable																
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
Availability facility (ref: closed)	12,24	***	13,40	***	2,39	***	2,92		3,02	***	1,30		1,43		9,94	***
Facility is a meeting place	4,43	***	2,57		^		7,37	***	4,55	***	6,45	***	5,56	***	9,77	***
Age in years (ratio)	0,99		1,01		1,00		1,02		1,02		1,01		1,03	***	1,03	***
Length of residence (ratio)	1,01		1,00		1,01		1,00		1,01		1,01	**	1,01	***	1,00	
Gender (0: male, 1: female)	1,66		1,22		1,69	**	1,02		1,26		1,06		1,12		1,25	
Urban or rural (1:rural, 2: urban =>5000 inhabitants)	1,63		0,43	***	0,73		0,53	***	0,52	***	0,79		0,41	***	0,91	
Work, no work, retired																
1: working	0,76		0,62		0,64		1,10		0,79		1,08		1,21		0,88	
2: not working	1,64		0,51		1,09		1,01		1,09		0,98		1,38		1,11	
3: retired (reference)																
Are there children living at home? (ref: yes)	1,67		1,18		0,95		1,10		1,77		1,55		1,76	**	1,57	**
Highest completed education																
1: low	0,46		1,56		1,08		1,19		1,48		1,21		1,33		1,08	
2: middle	0,60	**	1,17		1,29		0,97		0,89		1,13		1,09		1,11	
3: high (reference)																

Table 4: (continued)

Dependent Variable, evaluation closure	**Grocery n= 1421**		**GP n= 1247**		**ATM n= 1267**		**Sports n= 1379**		**School n= 1505**		**Cafe n= 1224**		**Comm C. n= 1397**		**Church/rel. n= 1467**	
0: not (very) regrettable/neutral, 1: (very) regrettable																
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
I feel at home in this village/ neighbourhood (V/N)																
1: disagree (very much)	1,05		0,50		0,74		0,51		0,55		1,07		0,89		1,05	
2: neutral	0,89		1,34		1,07		0,65		1,04		0,87		0,69		0,82	
3: agree	1,53		1,43		1,48		0,91		1,30		0,97		0,97		1,08	
4: agree very much (reference)																
I am actively involved in my V/N																
1: disagree very much	0,81		0,72		0,72		0,69	**	0,43		0,88	**	0,53	**	0,56	***
2: disagree	3,56		0,50		1,89		0,89		0,61		0,97		0,87		0,53	
3: neutral	1,83		0,89		1,85		1,24		0,64		1,39		0,86		0,72	
4: agree	1,54		0,75		1,87		1,92		0,83		1,69		1,61		1,22	
5: agree very much (reference)																
How often do you come outside place of residence																
1: > 6 times a week	0,35	**	1,09		1,24	**	0,45	**	0,56		0,66		0,57		0,87	
2: 3-5 times a week	0,57	**	0,74		1,45		0,55	**	0,63		0,81		0,65	**	0,78	
3: 1-2 time a week	0,41		0,98		0,69		0,74	**	0,62		0,76		0,70		0,82	
4: < 1 time a week (reference)		**								**						

Table 4: (continued)

Dependent Variable, evaluation closure	**Grocery n= 1421**		**GP n= 1247**		**ATM n= 1267**		**Sports n= 1379**		**School n= 1505**		**Cafe n= 1224**		**Comm C. n= 1397**		**Church/rel. n= 1467**	
0: not (very) regrettable/neutral, 1: (very) regrettable																
Predictor variable	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**	**OR**	**sig**
Do you feel connected/bonded to your V/N																
1: not connected (at all)	0,84		1,33		1,74		0,92		0,56		0,55		0,43		0,81	
2: neutral	0,58		0,88		0,96		0,69		0,79		0,68		0,61		0,92	
3: connected	0,82		1,05		1,09		0,84		0,86		0,82		0,65		0,79	
4: very connected (reference)																
Constant	0,881		3,15		1,58		0,72		2,12		0,34		0,89		0,01	***
Model X2, df=24, p< 0.01	X2= 221,781		X2= 70,576		X2= 75,421		X2= 306,627		X2= 157,902		X2= 258,274		X2= 324,049		X2= 476,058	
Nagelkerke R2	0,362		0,145		0,114		0,303		0,179		0,254		0,311		0,37	
Hosmer & Lemeshow test	p = 0,03		p = 0,720		p = 0,784		p = 0,903		p = 0,173		p = 0,620		p = 0,194		p = 0,609	
Classification accuracy overall / 0 / 1	94,0%		93,3%		88,6%		79,5%		86,4%		67,5%		78,2%		75,5%	

** significant for p< 0.05 *** significant for p< 0.01 ^ supressed due to low cell count
Availability of [facility] in village/neighbourhood was asked during time of residence, and 'I don't know' and 'no was never available' was coded as missing vairables
We made sure that the reference categories of the indendendent variables were not the smallest category

5.5 Conclusion

Discussion

This study shows that there is an endowment effect that influences perceptions of facility-decline. First if all, people value certain local facilities more if they are used to having one available in their village or neighbourhood. We tested for eight local facilities: grocery stores; primary schools; general practitioners (GP); community centres; ATM's; cafés; sports facilities; and churches or other religious facilities. Our analysis shows that while churches and cafés were found to be less important, all eight facilities showed a significant relationship between 'endowment' (current, past or a lack of availability in the village or neighbourhood) and 'valuation' (how important or unimportant). This endowment effect also holds up when we control for other possible explanatory variables; the mere availability of a grocery store, GP, ATM, sports facility or primary school significantly influenced positive valuation. This effect also works the other way; when people are used to *not* having a GP, ATM, primary school or café, they are more likely to value this facility as unimportant or neutral. The other variable that was a strong positive predictor for positive valuation of all eight facilities was the social function of facilities as a meeting place. The results of the third research question on the 'evaluation' of closure reinforce the earlier findings and provide the insight that the endowment effect influences the 'sense of loss' that often occurs when facilities are threatened with closure. Current availability and the social meeting place function stand out as significant predictors for the negative evaluation of (potential) closure. It is possible that senses of loss may be stronger for facilities that are *threatened* by closure, since *"foregone gains are less painful than perceived losses"* (Kahneman et al., 1991 pp203).

Limitations and future research directions

Although this study only looks at the first part of the socio-psychological process of dealing with place change (see figure 5.1), there are likely implications of the endowment effect in spatial contexts that lead to loss aversive behaviour. The next step would be to study how, and to what extent, the endowment effect influences protective behaviour, since negative evaluation of change and expressed behavioural intent does not necessarily translate into real behaviour (Aabø 2005). Moreover, there is a need for more research on the relationship between the endowment effect, loss aversion, collective psychological ownership of places, place attachment and place identity. For example, Devine-Wright and Howes (2010) found that the construction of windmills was perceived as a 'loss' of natural landscape-

values. Moreover, several studies showed how psychological ownership increases a willingness to act and protect nature (Preston and Gelman, 2020; Wang, Fielding and Dean, 2023) or public goods (Peck et al., 2021). Collective psychological ownership of a neighbourhood can increase the chance that people want to be responsible and involved through local participation (Toruńczyk-Ruiz and Martinović, 2020). With regard to methodology, we agree with McCarter, Rockmann and Northcraft (2010) that the WTA/WTP paradigm is not particularly suitable for social dilemmas. Strauss (2008) argues for mix-method interdisciplinary research on the phenomenon of loss aversion and Haartsen and Gieling (2021) call for more longitudinal studies on how negative perceptions of place-change can subside over time, possibly while exploring the effect of residential sorting (Elshof et al., 2017). We see opportunities for various disciplines to consider prospect theory when studying the perceived loss of environmental, landscape or public places. These directions for future research are not only interesting from a scientific perspective, but can also be particularly useful to inform policy and planning practices.

Insights from behavioural economics, such as prospect theory, are gaining more attention and are already being applied to public policy design (Oliver, 2013). For instance, 'nudge policies' use behavioural, economic, and psychological insights to influence people's behaviour in a subtle way, often without people even realising, in order to achieve certain policy goals (Matjasko *et al.*, 2016). However, a critical perspective should be applied since recent studies show publication biases and disappointing results from nudge units (Maier et al., 2022; Mols et al., 2015). Another (less manipulative) option is to use participatory or co-creative planning methods, which have been shown to reduce the perceived disruption of place bonds (Clarke, Murphy and Lorenzoni, 2018). When it comes to planning for facility-decline, these policies might be more useful than the traditional top-down central-place-style models, which assume rational behaviour (Christaller, 1933; Strauss 2008). By only assessing the closure of facilities through a rational lens, the psychological dimension that recognizes attachments and psychological biases is neglected. It is increasingly acknowledged that local facilities are also valued for their social and symbolic meanings, but now we also demonstrated that the endowment effect can influence perceptions of place-change. The insights of this study emphasize the need for practitioners and politicians to pay more attention to people's natural, but often non-rational, preference for status quo. This can, for instance, be achieved by providing guidance during the process of place-change via participatory processes that give residents a sense of control over their living environment.