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*Leisure – Non-Leisure Balance & Life Satisfaction:
The effect of time use on the life satisfaction of the German working
population*

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ABSTRACT

This paper proves the inverted u-shaped relationship between the time use concept, leisure – non-leisure balance (LNLB) and life satisfaction by investigating the German Socio-Economic Panel (GSEOP). 88% of the German working population refer to the non-leisure imbalance group and would increase life satisfaction by spending more hours on leisure time or less hours on non-leisure time. The optimal ratio between leisure and non-leisure time (LNLB) is achieved by spending approximately half of your total non-leisure time on leisure activities. Moreover, the inverted u-shape curve reveals that people (12%) can also spend too much time on leisure (leisure imbalance group). However, the analysis show that the magnitude of the effect on life satisfaction is very small. Thus, time matters, but only to a certain extent. This outcome has implications for policy makers, employers and individuals. Moreover, future research should concentrate on a more psychological approach than a sole time consideration to elaborate on the effect of balance on life satisfaction.

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1. Introduction

Ancient philosophers, as Aristotle, already stated that life satisfaction is the ultimate purpose in human life and achieved by maintaining a mean, or the balance between two excesses (Aristotle & Ross, 2017). Time might be a crucial determinant of life satisfaction due to several reasons: it is a natural metric for social comparisons (equal resource for all people), a scarce resource with only 24 hours a day and a universal good, which everyone needs to do or become anything (Goodin, Rice, Parpo & Eriksson, 2008). Moreover, developments, such as a higher labor participation of married women or the speeding-up of life in a computer and media dominated world, have increased the perceived time stress of individuals and encouraged unhealthy imbalances¹ without spending sufficient time on fundamental activities for well-being, as for example leisure (Zuzanek, 2004; Bachmann, 2000; Bond, Galinsky & Swanberg, 1998). Thus, studying 'time use', in particular the balance² between leisure time and non-leisure time (LNLB) on a large sample, is highly useful to further understand the concept of 'life satisfaction'.

Previous literature on the concept of balance and life satisfaction concentrated on the three life domains, work, family and leisure and can be summarized in the following three research streams: 1. Work-Life³ Balance (WLB), 2. Work-Family Balance (WFB), 3. Occupational⁴ Balance (OB). The first two streams have proven that perceived work-life conflict and work-family conflict negatively influence life satisfaction (Russo, Sune & Ollier-Malaterre, 2014; Haar, Judge, Boudreau & Bretz, 1994; Rice, Frone & McFarlin, 1992). Moreover, the researchers show the interrelation of different life domains on a person's domain satisfaction, such as the influence of work on one's satisfaction with family life and family on one's satisfaction with work, which eventually affect life satisfaction. However, these studies do not look beyond the investigation of two life domains, as leisure and work or family and work (Greenhaus & Allen, 2011), lack the investigation of a heterogeneous panel sample

¹ According to numbers of the AOK (Allgemeine Ortskrankenkasse), the largest German insurer, one tenth of sick days are related to mental illness in 2010, nine times as much as reported in 2004 (Johnson, 2013)

² Balance can be defined in various ways (see Literature Review – Balance & Life Satisfaction) In this study balance is the optimal ratio between hours spent on 'leisure activities' and 'non-leisure activities'. The optimal balance between these time categories is not predetermined, but investigated in the dataset itself.

³ Life=leisure

⁴ The term 'occupation' is equated with 'activity'.

(Kossek & Ozeki, 1998) and keep a subjective nature, as they use perceived conflict as a measure and not an objective measure, as time. The third stream of research explored the developed concept of 'occupational therapy' by Adolf Meyer (1922), which states that a balance in the four different occupations, work, leisure, self-care and rest, increases the subjective health levels of individuals. Whereas Wilcock et al. (1997) generally concluded that an almost equal involvement in the four occupations increases well-being, other OB researchers (Håkansson, Lissner, Björkelund & Sonn 2009) highlight the subjective nature of occupational balance, which varies for each individual. OB researchers concentrate on very small samples, do not use 'life satisfaction' but mainly 'subjective health'⁵ as the main dependent variable.

The impact of leisure on life satisfaction has been proven by many researchers, who highlight that leisure activities have the crucial characteristics of being voluntary, intrinsic and joyful (Bailey & Fernando, 2012; Iwasaki, 2007; Godbey, 2007) and trigger psychological mechanisms, as detachment-recovery, autonomy, mastery, meaning, and affiliation (Newman, Tay & Diener, 2014). These authors prove the positive impact of leisure on happiness with different methods, as the Day Reconstruction Method (DRM) by Kahnemann, Krueger, Schkade, Schwarz & Stone (2004), who investigated the effect of different activities during the day on positive and negative affections. Moreover, the studies of Aaker, Ruud & Mogilner (2011) or Dunn, Gilbert & Wilson (2011) formulate clear principles⁶ by highlighting the importance of leisure on happiness. However, these studies investigate unidimensional relationships between different types of activities and happiness, but not life satisfaction, and do not consider the trade-off of leisure with other life domains, for instance work or family. Besides the positive effect of leisure time, time spent on non-leisure activities may also benefit life satisfaction. First, the participation in roles of the non-leisure domains, work and family, represents a major contribution to life satisfaction (Verbrugge, 1983). Nevertheless, from a social role perspective, balance is only achieved, if individuals can fulfil these roles by, for example, spending sufficient time on work and family (Christiansen & Matuska, 2006). Second,

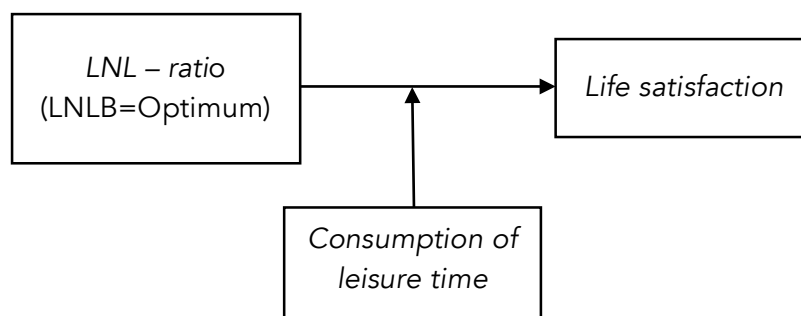
⁵ Perceived 'subjective health' is asked by stating the following question: 'How do you rate your health in general?' The measurement usually ranges on a five-point scale, from 1 (excellent) to 5 (poor). (Håkansson et al., 2009)

⁶ Aaker, Ruud & Mogilner (2011) come up with following five principles: 1. 'Spend your time with the right people', 2. 'Spend your time on the right activities', 3. 'Enjoy the experience without spending the time', 4. 'Expand your time', 5. 'Be aware that happiness changes over time'. One of the 8 principles in the study of Dunn, Gilbert & Wilson (2011) that relates to time behavior is 'Help others instead of yourself'.

spending more time on work may increase income on a personal or household level and, consequently, increase life satisfaction by higher consumption opportunities (Easterlin, 2010).

The aim of this study is to explore what ratio between leisure activities and non-leisure activities maximizes life satisfaction (LNLB⁷) and how this optimum depends on the consumption of leisure time. The following graph visualizes the conceptual framework of this study:

Graph 1: Conceptual Framework



The effect of the 'LNL-ratio' on life satisfaction is investigated by analyzing the German socio-economic panel (GSOEP) over multiple years starting from 1992 till 2015. Thereby, this paper contributes to the understanding of the causal effect of a time balance concept on life satisfaction. The second contribution relates to GSOEP's representability of the German population to be able to derive general conclusions. Finally, this study adds a new measurement of time balance, the leisure – non-leisure balance (LNLB) to the existing research streams and puts leisure in the center of this study due to psychological reasoning (Ås,1987) and the high impact of leisure on life satisfaction, which allows to consider all three life domains, leisure, work and family, and to analyze such a big sample, as the GSOEP.

While the results of this study show an inverted u-shape relationship between 'LNL-ratio' and life satisfaction, the 'LNLB' or the optimal ratio lies on the very right end of the investigated sample with an approximate relation between non-leisure and leisure time of 2 to 1. This means, that the majority of individuals live a non-leisure imbalance and would be more satisfied, if they spend more time on leisure. However, this magnitude of the effect on life satisfaction is rather small. Moreover, this paper proves that 'doing sports' positively

⁷ The ratio between leisure activities and non-leisure activities refers to the term 'LNL-ratio' (see Graph 1) and the optimal ratio that maximizes life satisfaction refers to the term 'LNLB' (Leisure – Non-Leisure Balance).

moderates the inverted u-shape relation between the 'leisure – non-leisure ratio' and life satisfaction to a certain extent. These outcomes can be considered as a guideline for individuals on how to optimize their time, for companies to rethink their general working policies or the employment contracts with their employees that could increase life satisfaction, which could lead to an increase in productivity and company profits (De Neve, Diener, Tay & Xuereb, 2013). Finally, the results can be used by policy makers to recommend policies on work-life balance or build infrastructure to encourage leisure activities and consequently increase and maintain a healthy workforce.

2. Literature Review

2.1. Life Satisfaction

„Life-satisfaction is the degree to which a person positively evaluates the overall quality of his/her life as-a-whole. In other words, how much the person likes the life he/she leads.“

(Veenhoven, Scherpenzeel & Bunting, 1996, p.6)

Economists have long committed the error to equalize income and life satisfaction, although income is just a means of life satisfaction (Frey & Stutzer 2002a, b). For several years social psychologists have directly asked the question about satisfaction and proved that it is a valid way to measure subjective well-being (Diener, Shu, Lucas & Smith, 1999; Kahneman, Diener & Schwarz, 1999; Veenhoven, 1984, 1999). They showed that a very simple question about the general life satisfaction covers substantial variance by input variables, as demographic and personal characteristics, as being married, healthy or employed. Thus, they seem to make a difference in the quality of people's life. Furthermore, public advisors and policy makers started acknowledging life satisfaction as a valid measure for subjective well-being by using results of satisfaction studies to recommend and implement policies (Stiglitz et al., 2009). Another argument for its validity is that economists use the satisfaction's measures as proxies for 'utility' in social behavior studies (Blanchflower & Oswald 2006; Layard 2005; Van Praag & Ferrer-i-Carbonell 2005; Frey and Stutzer 2002b, p. 405; Easterlin 2001).

The typical 'life satisfaction' question is formulated as follows: 'How satisfied are you with your life in general?' Subjects are supposed to value their life satisfaction on a scale from

zero (totally unhappy) to ten (totally happy).

2.2. Life Balance and its relation to Life Satisfaction

Previous literature on 'life balance' defined the term 'balance' in various ways: 1. The perceived conflict levels between different life domains (Judge et al. (1994), Rice et al. (1992)), 2. The subjective feeling about the balance between different life domains (Haar et al. (2014), Greenhaus & Allen (2011)), 3. Equal time devoted to different life domains (Greenhaus et al. (2002)), 4. Equal satisfaction in different life domains (Greenhaus et al. (2002)), 5. Equal involvement in different life domains (Greenhaus et al. (2002)).

Time represents one of the indirect measures of balance without asking individuals directly about their balance, or conflict, between different domains. As a result, time has the characteristic of being an objective metric that allows to analyze a big sample, such as the GSOEP, and to derive general conclusions. At the same time, time has the important feature of being a universal good, which everyone knows and uses to organize their life's. This allows to not only make general, but also practical conclusions. In contrast to the OB research stream, which uses at least 4 different time categories, and has only been applied by conducting interviews on small samples, this study defines two time categories, namely leisure and non-leisure time. The crucial impact of leisure on life satisfaction with its characteristic of being voluntary, intrinsic and joyful, makes leisure the center of the investigation and incorporates a psychological aspect in this LNLB concept. In contrast, non-leisure time, which has a lower degree of freedom (Ås,1987) and is consequently often considered as more obligatory, represents the second time category. As a result, the LNLB concept makes it possible to analyze such a big sample as the GSOEP, while using psychological reasoning (Ås,1987) and considering all three life domains, leisure, family and work.

2.2.1. Work – Life Balance (WLB)

The tradeoff between 'work' and 'leisure' represents a conflict between time and money which can be explained by a simple economic approach, discussed by Zuzanek (2004). If people behave rationally and maximize utility, they will continue working as long as the utility of income of another hour of work outweighs the benefits of another hour of leisure.

This is the main argument the economics of work and leisure. An important theory to understand the relation between income and happiness or utility is stated by the 'Easterlin Paradox', which highlights the 'diminishing marginal utility' of income (Easterlin, 1974). Whereas more income makes you much happier for low levels of income, such effect is much lower for high levels of income. A similar argumentation was applied on the link between leisure and life satisfaction by Eriksson, Rice & Goodin (2007). Further, the authors also come up with the 'opportunity cost of leisure' to state the direct tradeoff between work and leisure activities: the higher the wage rate, the higher the 'opportunity cost of leisure' and the lower the time spent in leisure activities. While the authors prove this theory in their study by showing that the 'wage rate' has a significant negative influence on 'leisure satisfaction', their models on 'leisure satisfaction' show that the negative 'income effect' by the wage rate is only a third compared to the positive 'time effect' of hours spent on leisure time. As the theory implies that a higher wage rate increases the work-life conflict, it should not only have a negative influence on leisure satisfaction, but ultimately also on life satisfaction. However, the investigation has shown that only household income has a significant (positive) effect on life satisfaction. This means that personal income does not matter when it comes to overall life satisfaction, while household income does. Moreover, the introduction of a new measure of freedom, such as 'discretionary time'⁸, Goodin et al. (2008) and Eriksson et al. (2007) showed an indirect positive 'income effect' and argued that higher earnings buy time or freedom leading to an increase in life satisfaction. In conclusion, the tradeoff between time and money is very complex and difficult to empirically clarify due to the various interrelated mechanisms of these two aspects.

Although theory assumes that people can freely choose the amount of working hours, empirical findings are not clear about this argument and the effect of working hours on life satisfaction. Rudolf (2014) explored the effect of work hours reduction by a labor regulation of the Korean population and concluded that there is no significant link between the amount of working hours and life satisfaction. The author argues that people could actually have mutual effects of a work hour reduction: on the one side, it intensifies the work that has been

⁸ The authors define 'discretionary time' as the residual of a 168 hours week after deducting the 'strictly necessary' time in paid labor, unpaid household labor and self-care to escape poverty level, which is calculated based on factors, such as the individual wage rate. (Eriksson et al., 2007)

done on a longer time period before and consequently could increase subjective stress levels; on the other side, it guarantees more time for family and leisure reducing the time conflicts to these life domains. After conducting a longitudinal study of the Korean and Japanese population, Hamermesh, Kawaguchi & Lee (2017) found a negative link between a work hour legislation and life satisfaction. However, as they explain, the investigated effect is not a clear isolated effect and could have been influenced by other factors. Opposing arguments and the sole consideration of the life domain, work, as a time measure leads to difficulties to derive conclusions on work hours and life satisfaction. The study of Rice et al. (1992) also considered leisure by defining WLB as work-life conflict. The authors showed that there is a negative effect between work-life conflict and life satisfaction and highlighted the interrelation between work and leisure on domain satisfaction, and eventually on life satisfaction.

In conclusion, time use studies on WLB discovered that the conflict between two life domains is not automatically decreased, if work hours are reduced. The dissatisfaction and the conflict level with other life domains can actually be increased due to the intensification of work. Research on perceived conflicts proved the negative relationship between work – life conflicts and life satisfaction.

2.2.2. Work – Family Balance (WFB)

In the work-family domain two important theoretical frameworks have to be mentioned: the gender neutrality hypothesis by Becker (1965) and the gender identity hypothesis by Akerlof and Kranton (2000). The former states the man and the woman divide up the entire hours of ‘market work’ and ‘housework’ in a household, independently of the gender. The latter assumes variation in utility between men and women arguing that gender matters.

In a longitudinal study from 2001 to 2004 Booth & van Ours (2009) researched 2326 couples and found out that men are more satisfied when they work full-time compared to part-time and women are more satisfied, firstly, if their counterpart works full-time, and secondly, if they work part-time themselves. Booth & van Ours (2009) concluded that gender matters and their results are consistent with the gender identity hypothesis by Akerlof and Kranton (2000). Tenbrunsel et al. (1995) derived similar conclusion by differentiating between the directions of work-family conflict, work-family and family-work conflict, of more than 280

dual-employed couples. Whereas for males work involvement positively influences family involvement (spillover effect), family involvement negatively influences work involvement. However, for females only the latter relationship was true, while there was no significant effect of work on family involvement. The authors concluded that these results are consistent with two theories, socialization theory, which states that women's main responsibility is family, and with economic theory, which states that the partner with lower income should emphasize family over work.

Judge, Boudreau & Bretz (1994) also concentrated on the influence of working hours and work-family conflict on life satisfaction. Contrary to Tenbrunsel et al. (1995), they showed a negative relation between work and family of male executives and no positive spillover effects, which means the more they work the less time they can devote to their roles in private life and, thus, the less satisfied they are. Besides the definition of WFB by work-family conflict, the study of Greenhaus, Collings & Shaw (2002) incorporates time use as one of their measurement dimensions, besides involvement and satisfaction measures. Consistent with Judge, Boudreau & Bretz (1994) they found out, that among individuals, who spent substantial time in both life domains, those who spent more time on family had a higher 'quality of life'⁹ compared to balanced individuals, while those who spent more time on work were the least happy.

The main results of previous WFB literature are twofold: 1. gender matters with regard to work and family roles; 2. the more time is spent on work compared to family, the less satisfied individuals are.

2.2.3. Occupational Balance (OB)

The third stream of research on balance is based on the "occupational therapy" by Adolf Meyer in 1922. The theory argues that a healthy lifestyle behavior above all, in particular, a balance between work, leisure, self-care and rest occupations, could improve mental illness problems, measured as 'subjective health'. Wilcock et al. (1997) asked 146 participants about their ideal and current balance in 'physical', 'mental', 'social', and 'rest activities', as well as their 'subjective health'. The authors concluded that the smaller the

⁹ Individuals were asked the question 'how do you feel about your present life?'

variance between the ideal and actual balance in activities, the healthier the participants rated themselves. Similar findings were derived by Håkansson et al. (2009), who made a questionnaire with 488 women and identified that 'occupational balance', as well as personally meaningful activities were both related to life satisfaction. Wagman et al. (2011) have built upon these studies and also asked participants about their individual 'life balance'. The authors concluded that participants perceive life balance as Wilcock (2006) states: *"Additionally, a balance of occupations between physical activity, intellectual challenges, spiritual experiences, emotional highs and lows, solitary and social in nature, effort, and relaxation is required"* (p. 139). Moreover, Wagman et al. (2011) argue that private life is a crucial component to be analyzed, as it represents a buffer for imbalances and highlights to investigate the entire life situation of individuals, namely, family, work and leisure in order to understand their life satisfaction (Wagman et al., 2011).

Finally, as OB concentrates on the subjective perception of each individual due to its psychological base, it is hard to derive general conclusions from previous literature. Most importantly, various occupations should be lived by individuals to experience life satisfaction, as physical, mental or rest activities.

2.2.4. Leisure – Non-Leisure Balance (LNLB)

Parker (1971) defines leisure as 'a period of time free from paid work or other obligatory activities'. Thus, leisure has the important feature to compensate for negative experiences in other life domains (Pearson, 2008). The feeling of having a 'sense of control' over one's life is an important aspect for increased physical health (Marmot, 2004; Pulkkinen, Kokkonen, & Mäkiäho, 1998), increased life satisfaction (Duncan-Myers & Huebner, 2000; Peterson, 1999; Veenhoven, 1984; Perlmutter & Monty, 1977), and decreased depression (Abramson, Metalsky, & Alloy, 1989). Csikszentmihalyi & Hunter (2003) showed that freely chosen activities, as it is for leisure activities, have a positive effect on happiness, whereas obligatory activities have a negative effect on it. As the degree of freedom in leisure activities is much higher than committed, for instance household activity, or contractual activities, as work (Andorka, 1987), a balance between rather controlled and rather autonomous time is an important factor to achieve happiness. Moreover, Eriksson et al. (2007) showed in their study,

that leisure time and a new measure of autonomy, 'discretionary time'¹⁰, have a significant positive effect on life satisfaction. In conclusion, people should feel a sense of control and experience a certain amount of autonomy in their lives. Leisure, as the time category with the highest degree of freedom, gives the chance to compensate negative experiences in work and household with positive ones.

In contrast to the positive effects of leisure time on life satisfaction, time devoted to non-leisure activities, as work, household work, errands, repairs or child care, can also have beneficial mechanisms on life satisfaction. The social role theory explains that roles in domains, as family and work, have a substantial impact on the satisfaction levels (Verbrugge, 1983). However, it is also important to fulfill the expectations of these roles and to avoid conflicts with employers or working colleagues (work) and wife, husband or children (family), which decrease satisfaction levels (Christiansen & Matuska, 2006). As a result, people have to spend sufficient time in those non-leisure domains in order to fulfill their roles and be satisfied. Besides that, spending more time on work can also increase your income and consequently life satisfaction. This means, that the balance between leisure and non-leisure activities also relates to the dilemma between leisure and income. Does another hour of work makes me more happy than another hour of leisure?

Besides the mentioned positive effects of both, leisure and non-leisure time on life satisfaction, another aspect of leisure and non-leisure time is the perceived stress levels. The study of Goodin et al. (2008) proved that 'leisure time' has a significant negative effect on 'subjective time pressure'. Moreover, the studies of Jonsson, Borell & Sadlo (2000), who highlighted the importance of occupational rhythm and regular life commitments, and Zuzanek (1998), who concentrated on different life-cycle situations, concluded that low levels of life satisfaction are related to both, low-levels and high levels of 'time-pressure' or 'stress'. In statistical language, one can expect a reversed U-shaped curve, plotting life satisfaction on the y-axis and time pressure on the x-axis. In simple words, a moderate lifestyle increases the level of happiness (Zuzanek, 1998).

¹⁰ 'Discretionary time' is the residual time after deducting the strictly necessary time spent in paid labor, unpaid household labor and personal care. The strictly necessary is calculated by deriving the hours spent necessary to escape the poverty level (Goodin et al., 2008).

The following graph summarizes the benefits of leisure time and non-leisure time with regard to life satisfaction:

Table 1: Overview of arguments

Positive effects of leisure and non-leisure time on life satisfaction		
Nr	Leisure Time	Non-Leisure Time
1	Intrinsic, voluntary, free character	Fulfilment of roles
2	Increased sense of control	Higher income
3	Lower stress levels	Positive stress levels
4	Compensate negative experiences	

This leads us to the main hypothesis of this study:

H1 – Leisure – Non-Leisure Balance: The relationship between the ratio of time spent on leisure and non-leisure activities and life satisfaction is an inverted u-shaped function.

2.3. Leisure Activities & Life Satisfaction

The right balance between leisure and non-leisure activities may depend on how people live their leisure time. This section will analyze the four important leisure activities, social activities, doing sports, attending religious events and volunteering and their direct positive influence on life satisfaction.

2.3.1. Social Activities

One important finding about the influence of leisure activities on happiness is the positive effect of social activities on happiness compared to solitary activities (Reyes-Garcia et al., 2009). Similarly, Lloyd & Auld (2002) found out that a higher engagement in social activities increases life satisfaction. However, Aaker et al. (2011) highlights to also spend the time with the right people, as friends and family, compared to work relationships, in order to be happy. These conclusions are derived from the findings of the Day Reconstruction Method

(DRM) study of Kahnemann et al. (2004), who prove that people experience the most positive affections on social activities and intimate relations. Thus, following hypothesis is derived:

H2A - 'Social Activity': The optimal balance between leisure time and non-leisure time for one's life satisfaction moves towards more leisure, if one spends more leisure time on social activities.

2.3.2. Sports

So far, only little attention has been given to the relationship between physical activity, as sports, and life satisfaction. Fox (1999) concluded in his study that doing sports improves mood and self-perception and, thus, mental well-being. He proved that it is an effective treatment for clinical depression and anxiety. As a consequence, if exercise reduces the symptoms of depression and anxiety, it could also have an influence on happiness (Huang & Humphreys, 2010). Forrest & McHale (2009) found out that women, who usually participated in sports activities are happier than women with similar characteristics, based on a model using sports facilities as an instrument variable. Valois, Zullig, Huebner & Drane (2004) explored the effect on high school adolescents and conclude that physical exercise is positively related to perceived life satisfaction. Moreover, the DRM study of Kahneman et al. (2004) also highlights the positive affections you get from exercising, which is among the favorite activities and is higher than all non-leisure activities. This leads us to following hypothesis:

H2B - 'Sports': The optimal balance between leisure time and non-leisure time for one's life satisfaction moves towards more leisure, if one spends more leisure time on sports.

2.3.3. Volunteering

When people elaborate on their daily activities, one important question should be asked (Aaker et al., 2011): What is the probability that the value of your time invested will increase over time? Dunn, Gilbert & Wilson (2011) refer to the power of memories in this context and argue that people should invest their time in experiences that remain sticky over

time, as they increase the happiness of a single moment. For instance, volunteering represents an activity that is highly underrated in our society and might be considered as inefficient and economically not rational, although proven to make people happy (Borgonovi, 2008; Thoits & Hewitt, 2001). Thinking beyond the current experience is an important tool to engage in social activities and to make people happy. Aaker et al. (2011) also highlight the importance to 'expand your time' by doing something meaningful, as helping others (Chance, Mogilner & Norton, 2011).

H2C - Volunteering: The optimal balance between leisure time and non-leisure time for one's life satisfaction moves towards more leisure, if one spends more leisure time on volunteering.

2.3.4. Spirituality

In addition, the concept of perceived time plays an important role in experiencing a happy life (Aaker et al. (2011)). Time is scarce and the more value you assign to time, the scarcer it gets (DeVoe & Pfeffer, 2011). Rudd & Aaker (2011) argued that the more you live in the presence, the more you can enjoy the present moment and the less you feel rushed and hurried. Mindfulness studies prove this argument and confirm that people, who breathe more deeply and slowly, perceive their day to be longer. A study of Campos et al. (2015), for instance, showed that time spent with yourself, in form of mindfulness and self-compassion, has a positive influence on the level of happiness. Furthermore, Masicampo & Baumeister (2007) proved that mindfulness practices have a positive influence on self-control. They suggested that self-control works as a muscle, that gets more tired the more tasks you do, for example. Mindfulness interventions are one tool to relax, reload the self-control muscle and eventually increase well-being. A study of Lim & Putnam (2010) on religion found out that religious people are more satisfied with their lives due to two main reasons: regular attendance of religious events and the creation of social networks within the religious community. This study takes the attendance of church as an instrument for mindfulness and spirituality. Thus, following hypothesis is derived:

H2D - 'Church': The optimal balance between leisure time and non-leisure time for one's life satisfaction moves towards more leisure, if one spends more leisure time on attending religious events.

In conclusion, the four leisure activities, social activities, doing sports, volunteering and attending religious events, are chosen among other leisure activities, as they have a higher impact on life satisfaction compared to other leisure activities, as watching TV, spending time on the PC or on the phone (Kahnemann et al., 2004).

3. Data & Methodology

The dataset investigated for this study is the German Socio-Economic Panel (GSOEP), which has been conducted annually since 1984 and started with 5921 households and 16205 observations. On the one hand, it asks for the overall life satisfaction, the time use in life domains and the frequency of various leisure activities. On the other hand, it covers important socioeconomic variables, as demographics, household characteristics, employment status or information about income. However, the GSOEP uses rigid coding measures for the predefined activities, which are asked by stating hours per day, compared to regular time-use studies. Despite this negative aspect, the combined information on life satisfaction, time use and socioeconomic aspects makes the dataset invaluable to find answers on the research topic.

This study only considers individuals, who are marginally employed, work part-time or full-time and excludes, for example, unemployed people, as unemployment has a crucial influence on the time use and life satisfaction of individuals (Zuzanek, 1998). Importantly, in order to avoid biased results, one specific case is dropped from the sample: individuals, who spend 0 hours on leisure activities. As it is assumed that everyone spends at least a certain time on leisure, these individuals probably did not answer the corresponding question appropriately.

In order to research the main hypothesis, 12 waves between the years 1992 and 2015 are considered with a total of 100,586 observations. The second model covers 68,859 observations, as the question of interest, the frequency in leisure activities, as social activity, doing sports, volunteering and going to church, was not stated in all 12 waves. Due to the

lack of the required questions, some years had to be dropped, therefore the sample used in this study is unbalanced.

3.1. Dependent Variable

The dependent variable life satisfaction is measured by asking the following question: 'How satisfied are you with your life, all things considered?' The respondents have to answer this question on an ordinal scale measure from 0 (completely dissatisfied) to 10 (completely satisfied). This measurement is directly used in the various models conducted.

3.2. Independent Variables

3.2.1. LNL - ratio

The variable of interest in this study represents the 'leisure – non-leisure ratio', named 'LNL-ratio'. It is derived by the definition of two main categories of activities, namely 'leisure activities' and 'non-leisure activities'. While the former comprises of the hours spent in leisure activities during a week, the latter consists of the total hours spent in non-leisure activities, specifically work, housework, errands, childcare and repairs. These different categories are measured by the following question in the GSOEP: 'How many hours do you spend on the following activities on a typical weekday, Saturday, and Sunday?'. Table 2 shows an overview of the exact answer sheet in the GSOEP Panel with all different activity types.

Table 2: Answer Sheet in GSOEP Panel (2009)

Activity	Hours on typical Weekday	Hours on typical Saturday	Hours on typical Sunday
Job, apprenticeship, second job (including travel time to and from work)			
Errands (shopping, trips to government agencies, etc.).			
Housework (washing, cooking, cleaning)			
Child care			
Care and support for persons in need of care			
Education or further training (also school, university)			
Repairs on and around the house, car repairs, garden work			
Other leisure activities and hobbies			

Once the total hours spent per week in leisure and non-leisure activities are calculated, a balance coefficient developed by Janis and Fadner (1965) and Deephouse (1996) is used (see Appendix for the exact formula). This coefficient yields values from 0 to 2¹¹ and is exactly 1 when an individual spends the same amount of hours in both time categories. While a score between 1 and 2 means that more time is devoted to 'leisure activities', a score between 0 and 1 represents a higher time consumption of 'non-leisure activities'. Moreover, the two extreme cases imply that no time is spent on leisure activities (2) and no time is devoted to non-leisure activities (0).

3.2.2. Leisure Activities

The GSOEP asks respondents the following question about the frequency of different leisure activities: "Which of the following activities do you take part in during your free time? Please check off how often you do each activity: 1. never, 2. less often, 3. at least once a month, 4. at least once a week".

Table 3: Answer Sheet in GSOEP Panel (2009)

Activity	never	less often	at least once a month	at least once a week
Meeting with friends, relatives or neighbors				
Doing sports yourself				
Volunteer work in clubs or social services				
Attending church, religious events				

This means that the frequency of leisure activities has four categories in total. However, for the year 1992, individuals had an additional option to answer this question and could also state to do these activities 'every day'. This case was resolved by combining the two most frequent options, 'every week' and 'every day' into one single category, so that only 4 categories are considered for all different years. As described in the methodology section,

¹¹ The coefficient originally yields values from -1 to 1 (see Appendix for the exact formula). However, as the quadratic term of the LNL-ratio is used, and a negative term is becoming positive when it is squared, one unit is added to the coefficient in order to have a only positive values from 0 to 2.

interaction terms with leisure – non-leisure ratio are formed to test the moderating effects of these activities.

3.2.3. Control Variables

In order to isolate the causal effect of the independent on the predicted variable, life satisfaction, crucial controls are included in the different models. Various happiness studies investigated that socioeconomic aspects explain a major variation of life satisfaction (Donovan and Halpern, 2002; Frey and Stutzer, 2002a, b ; Diener et al., 1999; Veenhoven, 1984; 1999). That's why following variables are added to the model: marital status, children in household and household income. Although happiness studies stated the weak effect of income on happiness, income is still a necessary predictor of life satisfaction. Due to the fact that time distribution decisions are often taken on a household level, household income is used by the monthly net household income.

In addition to the socioeconomic aspects, the models will control for the health status of the individual, which is supposed to be one of the main predictors of life satisfaction (Angner, Gandhi, Purvis, Amante & Allison, 2013). This variable is measured by a scale from 1 (very good) to 5 (bad).

3.3. Descriptive statistics

In Table 6 the number of observations, the mean, the standard deviation and the minimum and maximum value of each variable is depicted. The table shows the difference in sample size between the two models. The main constraint on the sample size for model B is caused by the social activity variable with a total of 73,118 observations. Moreover, table 6 shows the correlations between the various different variables. It can be seen that there is no high correlation between any of the variables. Table 4 and 5 show the frequencies of the four different leisure activities, 'social activities', 'sports', 'church' and 'volunteering', as well as socioeconomic variables, as 'gender', 'health status' and 'marital status'.

Table 4: Frequency tables – Leisure Activities

social activities	Frequency	Percent	Cum.	church	Frequency	Percent	Cum.
[1] never	763	1.04	1.04	[1] never	61,479	61.32	61.32
[2] seldom	12,040	16.47	17.51	[2] seldom	25,074	25.01	86.33
[3] once a month	29,578	40.45	57.96	[3] once a month	8,482	8.46	94.79
[4] once a week	30,737	42.04	100	[4] once a week	5,224	5.21	100
Total	73,118	100		Total	100,259	100	

sports	Frequency	Percent	Cum.	volunteering	Frequency	Percent	Cum.
[1] never	35,780	35.71	35.71	[1] never	68,458	68.310	68.310
[2] seldom	17,696	17.66	53.37	[2] seldom	13,673	13.640	81.950
[3] once a month	16,088	16.06	69.43	[3] once a month	9,890	9.87	91.82
[4] once a week	30,634	30.57	100	[4] once a week	8,197	8.18	100
Total	100,198	100		Total	100,218	100	

Table 5: Frequency tables – gender, health status, marital status

gender	Frequency	Percent	Cum.	health status	Frequency	Percent	Cum.	marital status	Frequency	Percent	Cum.
[1] Male	53,151	52.84	52.84	[1] very good	10,235	10.18	10.18	[1] Married	65,608	65.23	65.23
[2] Female	47,435	47.16	100	[2] good	48,720	48.44	58.61	[2] Single	22,283	22.15	87.38
Total	100,586	100		[3] satisfactory	31,241	31.06	89.67	[3] Widowed	1,508	1.5	88.88
				[4] not so good	9,213	9.16	98.83	[4] Divorced	8,870	8.82	97.7
				[5] bad	1,177	1.17	100	[5] Separated	2,317	2.3	100
				Total	100,586	100		Total	100,586	100	

Table 6: Summary statistics & correlation matrix

Variable	Obs	Mean	Std. Dev.	Min	Max	life	LNL	marital	health	nr_ch	hhinc	social	sports	volunt	church
life satisfaction	100,586	7.204	1.5859	0	10	1.000									
LNL-ratio	100,586	0.418	0.2291	0.0111662	1.55	0.052	1.000								
marital status	100,586	1.608	1.0362	1	5	-0.079	0.084	1.000							
health status	100,586	2.427	0.8376	1	5	-0.400	-0.029	-0.003	1.000						
number of children	100,586	0.765	1.0100	0	9	0.066	-0.277	-0.198	-0.066	1.000					
household income	100,586	3072	1842	250	85000	0.186	-0.007	-0.192	-0.054	0.085	1.000				
social activities	73,118	3.235	0.7561	1	4	0.156	0.129	0.041	-0.127	-0.005	0.019	1.000			
sports	100,198	2.415	1.2524	1	4	0.128	0.085	0.027	-0.145	-0.015	0.192	0.189	1.000		
volunteering	100,218	1.579	0.9653	1	4	0.065	-0.011	-0.071	-0.015	0.084	0.107	0.086	0.182	1.000	
church	100,259	1.576	0.8521	1	4	0.102	-0.018	-0.128	-0.016	0.168	0.075	0.079	0.066	0.281	1.000

3.4. Methodology

Due to the panel characteristic of the dataset a Hausman-Test is performed to check whether the appropriate model is a 'random effects' or 'fixed effects' model (Cameron & Trivedi, 2010). As the null hypothesis¹² that there is no significant difference between the independent variables and individual unobserved heterogeneity can be rejected¹³. the correct model to use is the 'fixed effects' model.

The study will conduct two separated models, which are explained in the following two sections: Model A relates to the first hypothesis and thus the relation between the LNL-ratio and life satisfaction; Model B corresponds to the investigation of the moderating effects of the individual leisure activities.

3.4.1. Model A

Model A tests the inverted u-shape relationship between the LNL-ratio and life satisfaction by using the following regression equation:

$$\text{Life satisfaction}_{i,t} = \beta_0 + \beta_1 \text{LNL-ratio}_{i,t} + \beta_2 \text{LNL-ratio}^2_{i,t} + \beta_3 \text{marital status}_{i,t} + \beta_4 \text{health status}_{i,t} + \beta_5 \text{number of children}_{i,t} + \beta_6 \log(\text{household income})_{i,t} + \alpha_i + \mu_{i,t}$$

The formula shows that life satisfaction is the dependent variable, whereas LNL-ratio and the quadratic function of the LNL-ratio are the main independent variable in this model. In a stepwise approach controls will be added to the model without controls: first, the categorical variables marital status, health status and number of children; second, the natural logarithmic of household income. As income is expected to have a diminishing utility with regard to life satisfaction, household income is used in the logarithmic functional form.

¹² The null hypothesis can be stated with following formula: $E(\alpha_i | x_i) = 0$. This means, that there is no significant difference between the individual unobserved heterogeneity α and the independent variables.

¹³ See Appendix Table a1

3.4.2. Model B

In order to investigate the moderating effects of the four leisure activities on the inverted u-shape relationship between LNL-ratio and life satisfaction, the direction of the optimal point has to be tested (Haans, Pieters & He, 2016). First, the following regression model for each individual leisure activity will be used, so that in total 4 different models will be conducted:

$$\text{Life satisfaction}_{i,t} = \beta_0 + \beta_1 \text{LNL-ratio}_{i,t} + \beta_2 \text{LNL-ratio}^2_{i,t} + \beta_3 \text{leisure activity} \times \text{LNL-ratio}_{i,t} + \beta_4 \text{leisure activity} \times \text{LNL-ratio}^2 + \beta_5 \text{leisure activity}_{i,t} + \beta_6 \text{marital status}_{i,t} + \beta_7 \text{health status}_{i,t} + \beta_8 \text{number of children}_{i,t} + \beta_9 \log(\text{household income})_{i,t} + \alpha_i + \mu_{i,t}$$

It has to be mentioned that the leisure activity variables are included, as continuous variables. Second, following formula is used to investigate the movement of the optimal point as a function of Z (leisure activity variable), stated by Haans, Pieters & He (2016):

$$\frac{dX}{dZ} = \frac{\beta_1 \beta_4 - \beta_2 \beta_3}{2(\beta_2 + \beta_4 Z)^2} \quad \text{Equation 1}$$

The direction of the optimal ratio simply depends on the sign of the numerator, $\beta_1 \beta_4 - \beta_2 \beta_3$. If this term is positive, the optimal ratio moves to the right. If the term is negative, the optimal point moves to the left. In order to test the significance of this direction change, the equation must be tested, if it is different from zero, at specific values of Z.

Moreover, a graphical analysis will be conducted to check the validity of the obtained results. For this reason, the sample will be divided into two groups for each leisure activity: 1. High frequency group: individuals, who participate in the specific leisure activity more often ('once a week' or 'once a month'); 2. Low frequency group: individuals, who participate in the specific leisure activity less often ('seldom', 'never'). In total, 8 models (2 per leisure activity) will be conducted based on the regression stated in Model A. After that, the predicted results of the two corresponding regressions of each leisure activity (high and low frequency group) on LNL-ratio will be plotted on a graph with a 95% confidence interval. Then, it is possible to analyze the trends of the two distinct curves, if a widening trend of the curves can be observed as leisure time increases (or as moving to the right on the x-axis

4. Results

This section presents the results of the two regression models. First, the results of Model A will be analyzed, followed by the interpretation of Model B with the analysis of the moderating effects.

4.1. Model A

Table 7 shows the results of the fixed effects model in a three step manner. Model A1 without controls proves the concave relationship between the 'leisure-non-leisure ratio' and life satisfaction with both terms, the linear and quadratic term of LNL-ratio, significant at the 1% level. As the sign of the linear term is positive and the sign of the quadratic term is negative, the effect of the 'leisure-non-leisure ratio' is diminished the more hours people spend on leisure in relation to non-leisure activities. The scatterplot in the appendix (Graph a1) plots the predicted results with a 95% confidence interval of Model A3 on the y-axis and the LNL-ratio on the x-axis and gives a clear overview of the concave relationship, which takes an inverted u-shaped form. Up to a certain turning point (LNLB), life satisfaction increases, when people spend more time on leisure. After this optimal ratio point, the effect becomes negative, which means that more leisure in relation to non-leisure decreases life satisfaction, on average.

Adding sociodemographic controls to the model slightly changes the magnitude of the linear and quadratic term of the LNL-ratio, but keeps both terms significant at a 1% level. By using the significantly positive coefficient of the linear term and significantly negative quadratic term of the LNL-ratio of the three different models, it is possible to calculate the optimal ratio of leisure and non-leisure time with regard to life satisfaction, by using following formula¹⁴:

$$\text{Model A1: } 0.5328417 / (2 * 0.4152235) = \underline{0.6416}$$

$$\text{Model A2: } 0.5076147 / (2 * 0.3428718) = \underline{0.7402}$$

$$\text{Model A3: } 0.4627034 / (2 * 0.3039677) = \underline{0.7611}$$

¹⁴ see Wooldrige (2012), (p.195, formula 6.13)

The optimal ratio, that maximizes life satisfaction, is 0.7611, derived from Model A3. This point lies on the right end of the sample, as 88.07% of the sample have a LNL-ratio that is lower than 0.7611. At this ratio, the mean hours spent on non-leisure activities is 59, which leads to approx. 28 hours spent on leisure activities (see Table 8). A person, who spends 17 hours on leisure and 59 hours on non-leisure, could increase the level of life satisfaction by 0.01 (+0.17%) on average, if the person devotes 11 more hours on leisure (+64.7%), ceteris paribus (see Table 8 – Model A3). This means, that the effect of the LNL-ratio on life satisfaction is very small. However, the graph a1 depicts that the effect is higher for low LNL-ratios, or people, who have a high non-leisure imbalance.

Based on the results of Model A the first hypothesis of this paper, the inverted u-shaped relationship between LNL-ratio and life satisfaction, can be accepted.

Table 7: Model A

Model A			
DV: life satisfaction	Model A1 no controls	Model A2 demographics	Model A3 income
observations	100,586	100,586	100,586
LNL-ratio	.5328*** (.0749)	.5076*** (.0728)	.4627*** (.0727)
LNL-ratio, squared	-.4152*** (.0746)	-.3429*** (.0721)	-.3040*** (.0719)
health status			
[1] very good			
[2] good		-.3291*** (.0163)	-.3383*** (.0162)
[3] satisfactory		-.7730*** (.0184)	-.7897*** (.0184)
[4] not so good		-1.3396*** (.0228)	-1.3589*** (.0228)
[5] bad		-2.3191*** (.0445)	-2.3305*** (.0444)
marital status			
[1] married			
[2] Single		-.0391* (.0226)	.0446* (.0231)
[3] Widowed		-.3258*** (.0657)	-.2592*** (.0657)
[4] Divorced		-.0290 (.0274)	.0328 (.0276)
[5] Separated		-.3703*** (.0324)	-.2845*** (.0327)
number of children		.0287*** (.0073)	.0344*** (.0073)
household income, log			.2491*** (.0142)
constant	7.0759*** (.0167)	7.6221*** (.0246)	5.6450*** (.1151)
sigma_u	1.2719	1.1490	1.1230
sigma_e	1.1592	1.1173	1.1150
rho	0.5462	0.5140	0.5035

Notes: ***significant at the 0.01 level., **significant at the 0.05 level, *significant at the 0.1 level, standard errors in brackets;

Table 8: Practical Example Model A1 – A3

Model A1				
Case	Life satisfaction	Non- Leisure ¹⁵	Leisure	Multiplicator
Optimum	7.24	66.5	23.0	2.9
Case II	7.23 (-0.01)	66.5	15.0 (-8.0)	4.4
Case III	7.22 (-0.02)	66.5	12.5 (-10.5)	5.3

Model A2				
Case	Life satisfaction	Non- Leisure	Leisure	Multiplicator
Optimum	7.81	65.5	29.5	2.2
Case II	7.80 (-0.01)	65.5	19.0 (-10.5)	3.4
Case III	7.79 (-0.02)	65.5	15.5 (-14.0)	4.2

Model A3				
Case	Life satisfaction	Non- Leisure	Leisure	Multiplicator
Optimum	5.82	59	28.0	2.1
Case II	5.81 (-0.01)	59	17.0 (-11.0)	3.5
Case III	5.80 (-0.02)	59	14.5 (-13.5)	4.1

4.2. Model B

Model B (see appendix table a2) shows the results of the fixed effects model for each specific leisure activity, including both, the interaction term with the linear and the quadratic term of LNL-ratio. First, the equation to calculate the turning point depending on the specific leisure activity (Z) is used to derive the direction of the optimal points. Table 9 gives an overview of each specific model. Except volunteering, all leisure activities show the expected positive sign of the numerator of equation 1 in the methodology part (equation 11 in the study of Haans, Pieters & He, 2016), which means a right shift of the inverted u-shape curve. As the coefficient, for example of doing sports, is 0.036 and positive, the entire equation 1 becomes positive and a right shift of the turning point can be shown. However, the direction of the optimal

¹⁵ For all three models A1-A3, the hours spent on non-leisure activities are derived by calculating the mean around the specific life satisfaction values.

point has to be tested if it is significantly different from zero (see Table 10). The results show the significance levels for all different values per leisure activity (Z). It can be observed that only sports show significant results with regard to ‘never’ (Z=1) or ‘less often’ (Z=2), significant at a 1% - level. Table 10 shows that, on average, people, who are never doing sports, have a 0.0614 lower LNL-ratio than people, who are doing sports less often, *ceteris paribus*.

Table 9: Direction of the optimal point

Direction of the optimal point		
Model B1 (social activities)	0.00575	right
Model B2 (sports)	0.03663	right
Model B3 (church)	0.01172	right
Model B4 (volunteering)	-0.00303	left

Note: Numbers are derived by using the numerator of Equation 11 in Haans, Pieters & He (2016)

Table 10: ‘nlcom’(Stata) test results

Nonlinear combination of estimators (nlcom test)				
Z	Model B1 social activities	Model B2 sports	Model B3 church	Model B4 volunteering
1	.0113 (.0266)	.0614*** (.0188)	.0503 (.0680)	-.0113 (.0609)
2	.0172 (.0445)	.1023*** (.0390)	.0534 (.0975)	-.0148 (.0737)
3	.0295(.0880)	.2032 (.1454)	.0568 (.1354)	-.0202 (.0902)
4	.0616 (.2352)	.5835 (.9787)	.0605 (.1819)	-.0291 (.1113)

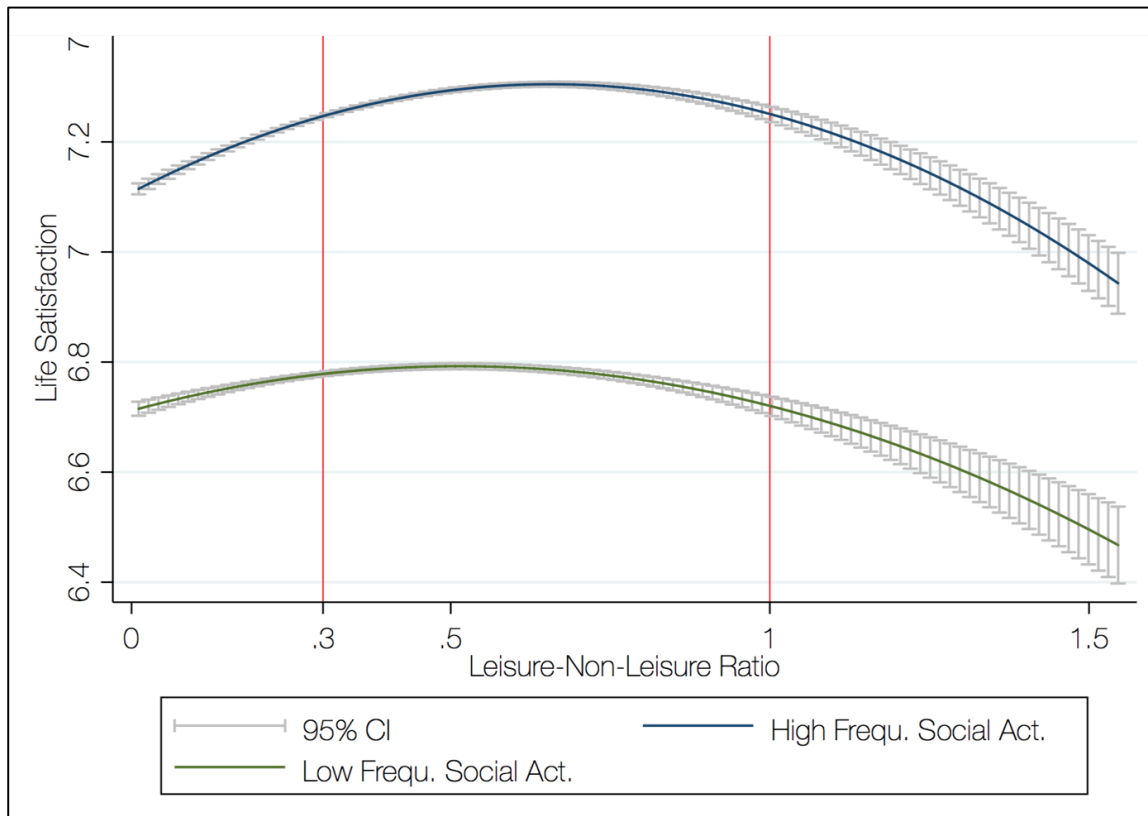
Notes: ***significant at the 0.01 level., **significant at the 0.05 level, *significant at the 0.1 level, standard errors in brackets;

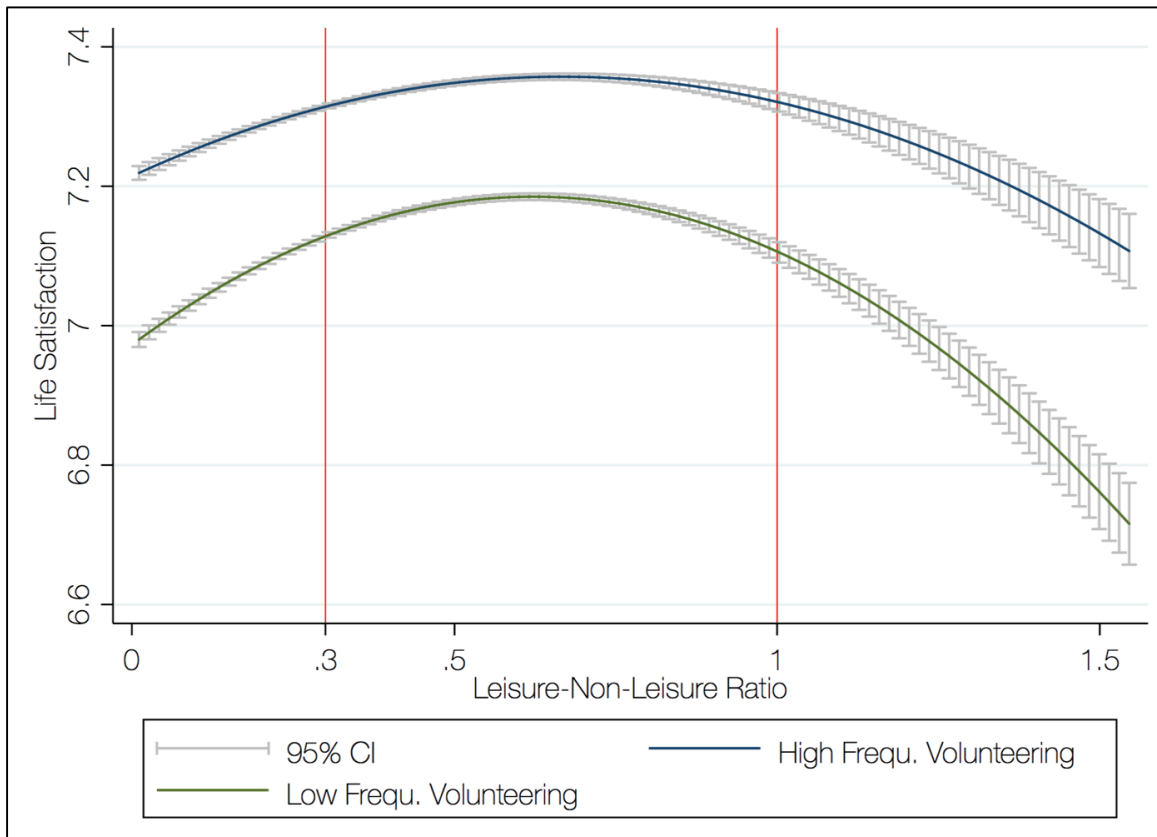
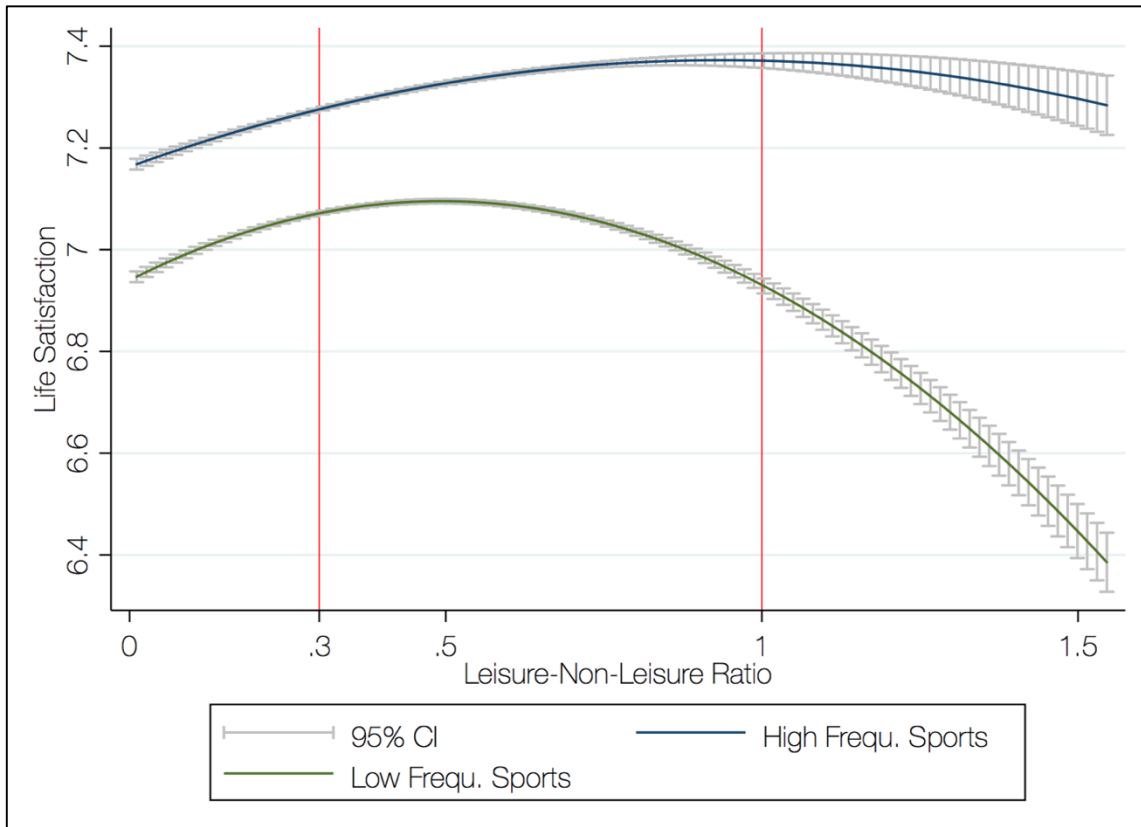
Besides the statistical analysis of the moderating effect on the inverted-u shape curve, a graphical analysis is conducted by running Model A with the split in low and high frequency groups by specific leisure activity (for all 8 models, see appendix table a3). Graph 2-5 depict the plotted outcomes of the regressions. The corridor between the red lines mark the majority of observations, specifically 63% of the entire sample. This allows to clearly analyze the trend of the two distinct curves for the crucial values of LNL-ratio. First, as in all four graphs the high frequency groups represents the upper line and confirms the direct positive relationship between all leisure activities and life satisfaction, only ‘doing sports’ (graph 3) reveals a clear widening of the gap between the high and the low frequency groups and, thus, a moderating

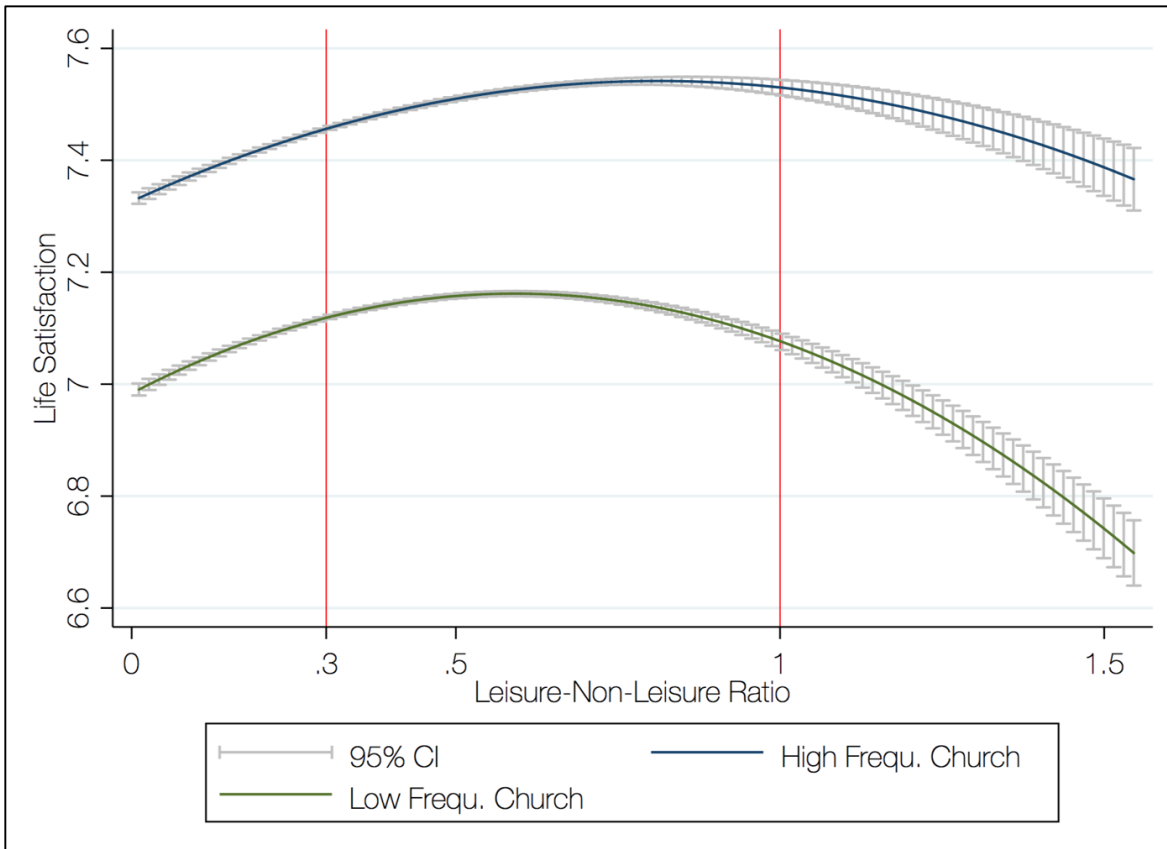
effect on the relation between LNL-ratio and life satisfaction. 'Attending church' (graph 5) shows a rather low increase of the difference between the two curves, which means that you can observe an almost equal trend of the two groups. 'Social activities' and 'volunteering' show that there is no clear moderating effect.

In conclusion, the significance test on nonlinear combinations of estimators, as well as the graphical analysis, prove that only higher frequency of 'doing sports' partially positively influences the main effect between the leisure – non-leisure ratio and life satisfaction. Therefore, while H2A, H2C and H2D have to be rejected, H2B can be partially accepted.

Graph 2-5: Moderating effects of 'social activities', 'sports', 'church' and 'volunteering'







5. Discussion

This study proves the causal effect of the leisure - non-leisure balance (LNLB) concept on life satisfaction. The results of the models depict the inverted u-shaped relationship of the leisure – non-leisure ratio (LNL-ratio) and life satisfaction. However, it is important to know that the LNLB, or the optimal ratio, in the GSOEP dataset lies on the very right end of the sample. In numbers, more than 88% of the observations refer to the non-leisure imbalance group and would benefit from more leisure time or less non-leisure time. First, it can be stated that leisure, with its characteristics of being voluntary, intrinsic and joyful, is a tool to increase life satisfaction. Second, life satisfaction could be optimized by reducing the working hours or other non-leisure activities, as child care or errands. The LNLB or the optimal point that maximizes life satisfaction refers to an approximate relation between non-leisure and leisure time of 2 to 1. After this point is reached, apparently too much leisure can be reached, so that the benefits of another hour of non-leisure outweigh the benefits of another hour of leisure.

According to previous literature the reasons for leisure imbalance can be the following: 1. Spending too much time on leisure may create more conflict potential with the important life domain of work. Less work hours not always mean higher life satisfaction (Rudolf, 2014). 2. Leisure has a diminishing marginal effect on life satisfaction. While it is important to find the counterbalance to work and other life domains, leisure can have a saturation effect (Eriksson et al., 2007). 3. A more difficult aspect is the investigation of the life domain, family. As both time categories, leisure and non-leisure time, have a part that involves family, there is not a clear cut between the categorization of family into one of the two categories. While non-leisure time includes child care, household activities or errands, leisure time also consists of time spent with family. On the one side, since the counterbalancing effect should also work for family, more leisure should make people more satisfied. On the other side, an imbalance towards leisure can also be achieved by spending less time on non-leisure categories, as child care, household activities and errands. Then, the family role might not be fulfilled, which leads to a higher conflict potential and a lower life satisfaction. In a nutshell, the majority of the German working population (88%) would increase life satisfaction, if they would spend more time on leisure or less time on non-leisure (non-leisure imbalance). The LNLB corresponds to a ratio between non-leisure and leisure of 2 to 1 (leisure – non-leisure balance). Moreover, too

much leisure can make people unhappy due to the saturation effect of leisure or the higher conflict potential with the work or family domain (leisure imbalance).

One of the major contributions of the time consumption concept, LNLB, is its practical relevance to consider for individuals, companies and policy makers. All three perspectives work on a common goal: maximizing life satisfaction in order to increase vitality, motivation and long-term economic success. The LNLB study gives a good indication that the consideration of leisure and non-leisure matters. People need time for themselves to compensate for the stress, evolved during work, or to fulfill other life roles as being a wife or husband and raising a family. Leisure time, for example by doing sports, gives you the opportunity to do something for yourself, stay vital, healthy and get energy for your life tasks. Individuals should assess their time schedules and organize themselves, so that they can spend more time on leisure and less time on non-leisure. It is important to constantly evaluate the benefits of another hour of non-leisure and another hour of leisure and increasing the joyful time for themselves and with the family, while fulfilling the roles of work and family. However, while this study reveals significant results, it is important to highlight that the magnitude of the LNL-ratio on life satisfaction is very small. A 65% increase of leisure time only relates to a 0,17% increase of life satisfaction (around the optimum). For people who can be defined as workaholics (left end of the sample), an increase in leisure time has a higher, but also only a moderate impact. This is a very interesting outcome, as the question of how much time is devoted to certain life domains (quantitative perspective) seems to be less crucial than the question of how satisfied you are with what you are doing (qualitative perspective). Thus, individuals, companies or policy makers might not have the biggest lever on specific measures to maximize life satisfaction by the sole consideration of the time dimension. Employers could rethink their working hours and spend more time on the investigation to implement new, alternative working contracts and, thus, help individuals to reach their optimal life satisfaction. Similarly, policy makers could encourage individuals to reach higher levels of fulfillment, for example, by implementing laws that reduce non-leisure time or facilitate the opportunity to participate in leisure activities, such as doing sports. But still, it is important to consider the magnitude of the impact to be clear about the effect of the specific time measures. Moreover, this outcome might also be interesting for psychologists, who deal with patients on work and family problems. The simple reduction of hours in specific life

domains to reach a balance, might not have the expected, high effect, if questions about the meaning and motivation are not discussed.

When it comes to the question how the optimum depends on leisure activities, the answers become more difficult. The results of this study show that only doing sports has a positive moderating effect on the inverted u-shape curve of LNL-ratio and life satisfaction. While the direct positive effects of engaging in social activities, doing sports, going to church and volunteering on life satisfaction confirm previous literature, the moderating effects that people, who live the same LNL-ratio are more satisfied, if they participate in one of the four chosen leisure activities, are not clearly present. However, one important limitation of this study is the measurement of the leisure activities, which were asked through 4 distinct categories and not through an open question on hours spent. A continuous measure would benefit the validity and accuracy of the results.

Research on balance and life satisfaction is a complex task and still at an early, unknown stage. Different approaches can be applied to find out what predicts the ultimate goal, life satisfaction: 1. Quantity (How much time is spent?), 2. Quality (Which activities are chosen?), 3. Meaning (Why are people deciding for specific time on activities?) While this study concentrated on the first two aspects, the third, psychological aspect might be crucial to understand and reveal profound knowledge on the motivation of our society. Then, following questions are important to consider when analyzing life balance and satisfaction: Do people aim life satisfaction or do they aim happiness or different aspects, as financial security or growth considering the nature of our system, in which money plays such an important role? We can not take it for granted that everyone aims for life satisfaction, while politicians and companies aiming for profits and GDP growth. Thus, do they see life satisfaction also as their ultimate life goal? And does the aim of people predict the time schedule they live (reversed causality)? A person, who proactively aims for life satisfaction, automatically could also experience a better time balance, as the person decided for the satisfaction path in his life compared to a person, who decided for the happiness or money growth path due to distinct reasons. And what about people, who can not answer the question what they are aiming for? Also, can people actually differentiate between happiness and life satisfaction? One limitation of this research might be the GSOEP questionnaire, which gives no explanation on the different meanings between life satisfaction and happiness. Individuals, who never thought about the definition of these two terms and also do not consciously aim this ultimate goal,

might also give wrong answers. It is a concept of feeling that has to be experienced to be understood. For example, happy people do not have to be satisfied, although people think they are satisfied, as they have never consciously experienced the difference of the states, happiness and satisfaction. Answers to the stated questions might reveal interesting insights on the motivation of our society and, ultimately, on the concept of balance and life satisfaction.

Besides the recommendation on a more psychological approach, research on time consumption could also focus on the detailed mechanisms that are in place in order to find the aspects, who have the highest lever to increase life satisfaction. For example, it would be interesting to understand which of the distinct arguments in Table 1, have the highest moderating effects on the relationship between LNL-ratio and life satisfaction. Finally, the investigation of specific subsamples, dependent on factors as gender, industry of work, type of position or age, might derive a more detailed understanding for specific life situations, as well as the investigation of different countries. The research on balance and life satisfaction is still at an early stage, which gives multiple opportunities to reveal new insights on effective lifestyles and attitudes that help society aiming higher levels of life satisfaction and as a consequence of that, increase long-term economic success.

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7. Appendix

Table a1: Hausman Test

Hausman Test				
	fe	re	difference	S.E.
LNL-ratio	0.46270	0.65437	-0.19167	0.03041
LNL-ratio, squared	-0.30397	-0.39251	0.08855	0.03027
health status				
[1] very good				
[2] good	-0.33828	-0.47502	0.13674	0.00695
[3] satisfactory	-0.78968	-1.06079	0.27111	0.00878
[4] not so good	-1.35889	-1.70708	0.34819	0.01088
[5] bad	-2.33054	-2.73479	0.40425	0.01813
marital status				
[1] married				
[2] Single	0.04458	-0.06809	0.11267	0.01757
[3] Widowed	-0.25920	-0.10126	-0.15794	0.04776
[4] Divorced	0.03277	-0.03124	0.06401	0.01936
[5] Separated	-0.28446	-0.29950	0.01504	0.01528
number of children	0.03443	0.04632	-0.01189	0.00487
household income, log	0.24911	0.44815	-0.19904	0.00939

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg
 Test: Ho: difference in coefficients not systematic

Graph a1: Model A3 life satisfaction – LNL-ratio

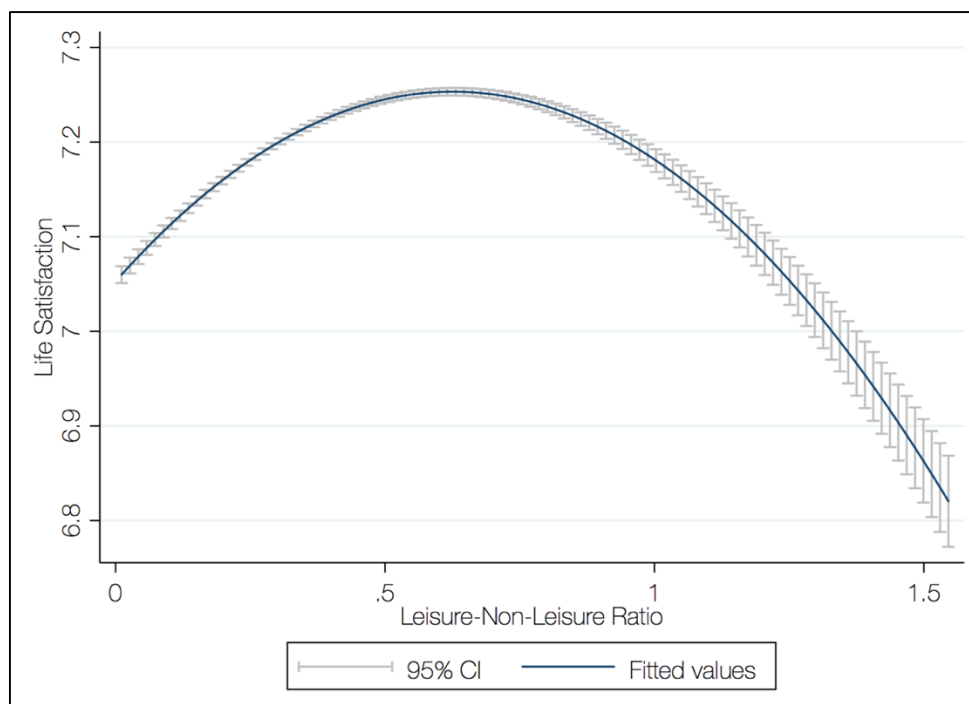


Table a2: Model B

Model B				
DV: life_satisfaction	Model B1	Model B2	Model B3	Model B4
	social_activities	sports	church	volunteering
observations	68,859	68,859	68,859	68,859
LNL-ratio	.7877** (.3525)	.6759*** (.1838)	.4444** (.1864)	.6033*** (.1642)
LNL-ratio, squared	-.6013* (.3598)	-.6693*** (.1870)	-.3511* (.1853)	-.4117*** (.1629)
c.leisureactivity#c.LNL-ratio	-.1167 (.1073)	-.0695 (.0670)	.0208 (.0993)	-.0746 (.0845)
c.leisureactivity#c.LNL-ratio_sq	.0964 (.1078)	.1230* (.0664)	.0099 (.0992)	.0459 (.0831)
leisure activity	.1384*** (.0242)	-.0020 (.0155)	.0026 (.0241)	.0092 (.0199)
health status				
[1] very good				
[2] good	-.3318*** (.0205)	-.3376*** (.0205)	-.3377*** (.0205)	-.3376*** (.0205)
[3] satisfactory	-.7818*** (.0231)	-.7928*** (.0231)	-.7929*** (.0231)	-.7931*** (.0231)
[4] not so good	-1.3215*** (.0285)	-1.3378*** (.0285)	-1.3380*** (.0285)	-1.3383*** (.0285)
[5] bad	-2.2903*** (.0555)	-2.3040*** (.0555)	-2.3058*** (.0555)	-2.3067*** (.0555)
marital status				
[1] married				
[2] Single	.0369 (.0280)	.0549* (.0280)	.0556** (.0280)	.0546* (.0280)
[3] Widowed	-.3008*** (.0816)	-.2894*** (.0817)	-.2907*** (.0817)	-.2887*** (.0817)
[4] Divorced	.0643* (.0336)	.0592* (.0336)	.0597 (.0336)	.0593 (.0336)
[5] Separated	-.3082*** (.0400)	-.3059*** (.0401)	-.3060*** (.0401)	-.3063*** (.0401)
number of children	.0437*** (.0090)	.0427*** (.0090)	.0420*** (.0090)	.0427*** (.0090)
household income, log	.2512*** (.0176)	.2410*** (.0176)	.2403*** (.0176)	0.2413*** (.0176)
constant	5.1544*** (.1635)	5.6694*** (.1477)	5.6693*** (.1490)	5.6506*** (.1466)
sigma_u	1.1254	1.1359	1.1342	1.1364
sigma_e	1.1082	1.1099	1.1100	1.1099
rho	0.5077	0.5116	0.5108	0.5118

Notes: ***significant at the 0.01 level., **significant at the 0.05 level, *significant at the 0.1 level, standard errors in brackets

Table a3: Model B - Graphical Analysis

Model B								
	Model B1		Model B2		Model B3		Model B4	
	low freq.	high freq.	low freq.	high freq.	low freq.	high freq.	low freq.	high freq.
obs	11,963	56,896	36,589	32,270	57,927	10,932	54,759	14,100
LNL-ratio	.3346 (.2733)	.4475*** (.1006)	.5446*** (.1344)	.2814** (.1428)	.4735*** (.0992)	.3478 (.2476)	.5415*** (.1042)	.3272 (.2221)
LNL-ratio, squared	-.1691 (.2847)	-.2991*** (.0989)	-.4943*** (.1374)	-.0758 (.1365)	-.3523*** (.0987)	-.1809 (.2438)	-.3848*** (.1037)	-.1985 (.2184)
health status								
[1] very good								
[2] good	-.3445*** (.0894)	-.3248*** (.0215)	-.3329*** (.0367)	-.3294*** (.0267)	-.3449*** (.0230)	-.2339*** (.0544)	-.3233*** (.0241)	-.3571*** (.0485)
[3] satisfactory	-.8819*** (.0950)	-.7503*** (.0245)	-.7797*** (.0398)	-.7808*** (.0316)	-.7948*** (.0257)	-.6792*** (.0623)	-.7742*** (.0271)	-.7555*** (.0548)
[4] not so good	-1.4915*** (.1062)	-1.2589*** (.0311)	-1.3053*** (.0464)	-1.2901*** (.0422)	-1.3512*** (.0316)	-1.1435*** (.0775)	-1.3499*** (.0332)	-1.1780*** (.0691)
[5] bad	-2.2718*** (.1579)	-2.2610*** (.0659)	-2.0822*** (.0810)	-2.5712*** (.0940)	-2.2500*** (.0615)	-2.4496*** (.1499)	-2.2861*** (.0640)	-2.2275*** (.1373)
marital status								
[1] married								
[2] Single	-.0467 (.1397)	.0540** (.0292)	.0132 (.0482)	.0790** (.0388)	.0396 (.0303)	.1401 (.1000)	.0311 (.0321)	.0920 (.0770)
[3] Widowed	-.1131 (.2108)	-.3352*** (.0988)	-.4879*** (.1158)	-.2170*** (.1468)	-.2183*** (.0962)	-.8201*** (.1813)	-.2673*** (.0944)	-.5544*** (.2136)
[4] Divorced	.3457*** (.1128)	.0138 (.0372)	-.0309 (.0523)	.1666 (.0520)	.0606 (.0361)	.1354 (.1294)	.0425 (.0384)	.1314 (.0918)
[5] Separated	-.2683** (.1328)	-.2886*** (.0441)	-.3815*** (.0643)	-.2677*** (.0583)	-.3089*** (.0436)	-.3050*** (.1304)	-.3290*** (.0460)	-.2505*** (.1051)
number of children	.1314*** (.0291)	.0283*** (.0099)	.0609*** (.0139)	.0306** (.0136)	0.0455*** (.0103)	.0172 (.0207)	.0374*** (.0109)	0.0529*** (.0196)
household income, log	.3766*** (.0644)	.2211*** (.0190)	.2616*** (.0290)	.2186*** (.0251)	.2531*** (.0195)	.1021** (.0494)	.2467*** (.0207)	0.2033*** (.0436)
constant	4.2005*** (.5223)	5.9025*** (.1542)	5.3995*** (.2329)	5.9780*** (.2063)	5.5340*** (.1585)	6.9864*** (.4026)	5.5709*** (.1678)	6.1115*** (.3566)

Notes: ***significant at the 0.01 level, **significant at the 0.05 level, *significant at the 0.1 level, standard errors in brackets

Table a4: Formula - Balance Coefficient (Deephouse, 1996)

Balance Coefficient (Deephouse (1996))		
I. Coefficient =	$(LT^2 - NLT*LT) / T^2$	if $LT > NLT$
II. Coefficient =	$(LT*NLT - NLT^2) / T^2$	if $NLT > LT$
III. Coefficient =	0	if $NLT = LT$
NOTE: $T = NLT + LT$; NLT = Total hours of non-leisure time; LT = Total hours of leisure time		