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Abstract

For the European AAL-JP-Project FEARLESS a multi-cultural user needs analysis was conducted in Austria, Catalonia (Spain), Germany and Italy. People aged 60+ (n=259) and their relatives (n=215) were questioned about i.e. their current living conditions, previous falls and fears related to a broad variety of critical incidents. In all cultures two categories of incidents were perceived as most threatening by primary users and relatives alike: events indicating a deterioration of health (e.g. falls, longer periods of inactivity) and fire. In the home environment of elderly users' five hot spots for falls could be identified: garden, living-room, stairs, bathroom and transition areas. Apart from these commonalities, users from Italy and Catalonia were particularly worried about housebreaking while solitarily living elderly from Austria and Germany frequently reported fear of social isolation.

Keyword List

multi-cultural user needs analysis, ambient event detector, fall detection, fire detection, worries, fears, mobility, elderly

DOCUMENT CHANGE LOG

Document Issue	Date	Reasons for Change
Version 1 Draft 1	25th Oct 2011	Initial version
Version 1 Draft 2	28th Oct 2011	Results of literature research included
Version 1	31st Oct 2011	Minor changes
Version 2 Draft 1	24th Feb 2012	Results for primary users and relatives from Catalonia (Spain), Germany and Italy available Preliminary results for Austria available
Version 2	22nd May 2012	Final results for primary users and relatives from Austria available

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LIST OF ABBREVIATIONS

AAL	Ambient Assisted Living
ACDC66	individual participant key
ADL	activities of daily living
COG	CogVis GmbH
CVL	Vienna University of Technology
e.g.	for example
etc.	and so on
i.e.	that is
INF	InfoKom GmbH
IPK	Fraunhofer IPK
I2C	i2CAT Technological Center
LIN	Linkcare Health Services
MED	Medical University of Vienna
n	number of participants
n.s.	not specified
PSY	University of Bamberg
QCA	qualitative content analysis
s.	see
SAM	Samariterbund Vienna
TES	TeSAN
TV	television
UNA	user needs analysis
WP	work package

1. INTRODUCTION

In this document we report the results of a multi-cultural user needs analysis conducted in the course of WP 1. On the basis of our survey data we would like to give answers to the following questions:

- What do elderly people fear?
- What do relatives of elderly people fear?
- Which functions should an ambient event detector provide in order to meet their needs in terms of fear resolution?
- In which part of the home environment do the most severe falls occur?
- How much money are users willing to spend on an ambient event detector?
- How much are users willing to spend on services related to an ambient event detector?

For this purpose quantitative and qualitative data was collected from elderly people (aged 60+), their relatives and trusted persons in Austria, Catalonia (Spain), Germany and Italy.

We would like to thank our partners in Austria, Italy and Spain for their great efforts in conducting and facilitating this study. Thanks are also due to our interns and student researchers at the Department of General Psychology and Methodology of the University of Bamberg (PSY) for their great dedication to this challenging endeavor.

Guidance for stressed readers: At the end of each chapter you will find a blue box titled *"How do these findings relate to the aims of the FEARLESS project?"* providing concrete project-related ideas and suggestions that have been derived from the survey data.

2. METHODOLOGY

In this section we outline the methodology of our multi-cultural user needs analysis, by describing its *target groups* and the methods used for *data acquisition* and *data analysis*.

Target Groups. Two different user groups were included into this survey so far: potential primary users and their relatives. Participants aged 60+ were defined as *primary users*. Within this very diverse group we decided to discriminate “third agers” (between 60 and 80 years) and “fourth agers” (older than 80 years). The different properties of these two age groups were first described by Baltes and Smith (1999). They are of great interest for the development of assistive technologies: The “third age” is characterized as a period of low morbidity rates and a high level of functioning which allows for adjustments to minor age-related impairments. By contrast, the so called “fourth age” is described as a period with an increasing need for assistance in terms of activities of daily living (ADL) and a considerably high multi-morbidity rate. For further differentiation we split up the “third agers” into two age groups (60 to 69 years; 70 to 79 years). Thus our primary user sample is divided into three predefined age groups.

The proportions of these age groups were matched to the demographics of each country. In addition we strived towards a sample featuring equal proportions of solitarily living and non-solitarily living elderly from urban (more than 20.000 inhabitants) and rural (less than 20.000 inhabitants) areas (pp. 13 - 15).

Relatives and other trusted persons of primary users were defined as *secondary users*. In a considerable number of cases primary users and their relatives participated in our survey (pp. 13 - 15). By using the same individual key on the questionnaires, these data sets can be reallocated without violating the anonymity of the participants. Such matched pairs (*tandems*) allow for a more specific analysis of the interrelation of perspectives.

Data acquisition. Two corresponding questionnaires were designed to capture both user perspectives. The UNA-questionnaires address the topics listed in Table 1. In corresponding sections primary users and relatives were asked the same questions. In the version for relatives these questions were slightly modified to reflect the third person view (s. Figure 1).

The content of the UNA-questionnaires and the tandem principle reflect a theoretical model from the field of Environmental Gerontology (Wahl, 2001; Wahl & Gitlin, 2007). This approach puts special emphasis on the dynamic interaction of an elderly person and his or her (social) environment in the course of everyday life. It claims that the phenomenon of ageing can only be understood if information about these different aspects is combined.

UNA-Questionnaire for Primary Users (elderly aged 60+)	**UNA-questionnaire for Secondary Users (relatives and confidants)**
Personal Data	Personal Data
Health Aspects*	Health Aspects*
Living Conditions*	Living Conditions*
Activities of Daily Living*	Activities of Daily Living*
Mobility	-- not included --
Social Participation*	Social Participation*
Familiarity with Technology	Familiarity with Technology
Life Events*	Life Events*
Critical Incidents*	Critical Incidents*
Assistive Technology	Assistive Technology
Questions and Suggestions	Questions and Suggestions

* Corresponding sections allowing for a comparison of user perspectives

TABLE 1: Contents of the UNA-questionnaires

Item S07 from the UNA-questionnaire for primary users:

S07 **That I might fall down the stairs and that it might take hours until somebody finds me, …**

does not worry me at all 1 – 2 – 3 – 4 – 5 *worries me very much*

Item S07 from the UNA-questionnaire for relatives:

S07 **That my relative might fall down the stairs and that it might take hours until somebody finds him,…**

does not worry me at all 1 – 2 – 3 – 4 – 5 *worries me very much*

FIGURE 1: Examples from the UNA-questionnaires

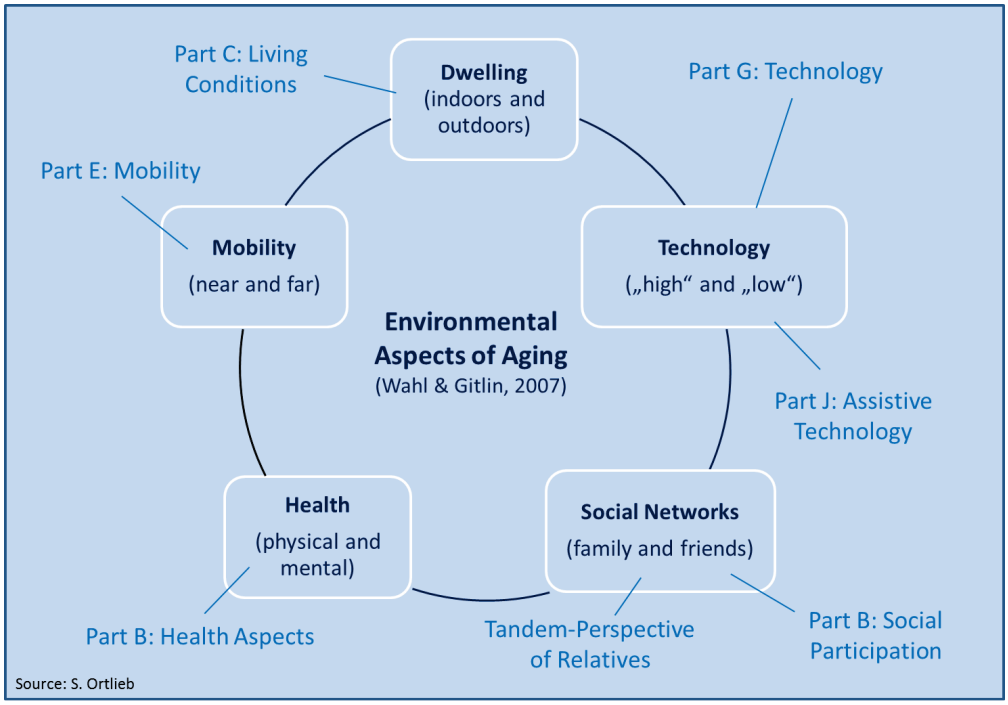

FIGURE 2: Environmental aspects of aging by Wahl and Gitlin (2007)

Our intention was to allow for a majority of elderly people to take our survey in spite of common age-related impairments (e.g. poor eye sight). Thus a preparatory study with 6 elderly from Germany was conducted to prevent a selective drop-out of potential primary users due to design aspects such as legibility (font size 14+, b/w, lettering with serifs), reasonableness of content (e.g. religious denomination) and length of the questionnaire (125 original items were reduced to 108 final items). Moreover the questionnaire for primary users may also serve as an interview guide.

The original UNA-questionnaires were designed in German. Following the usability study the UNA-questionnaires were translated into English. The English version was then translated into Catalan, Italian and Spanish.

In Austria SAM distributed 180 UNA-questionnaires to subjects from Vienna (urban area) and Burgenland (rural area). The return rate was 31%. In Catalonia I2C arranged for 100 face-to-face interviews with primary users and relatives from Barcelona and the surrounding rural areas. Here the UNA-questionnaires were used as an interview guide. PSY distributed 300 questionnaires to students of the University of Bamberg who passed them on to their parents and grandparents throughout Germany. 15 family members of co-workers were surveyed as well as 5 participants from Lower Franconia who responded to an advert in a local newspaper. The overall participation rate was 57%. In Italy TES arranged for 100 phone interviews with primary users and relatives

from Padua and from rural areas in the south of Padua. The two UNA-questionnaires served as an interview guide. For Italy the rate of participation was 56%.

Data analysis. The UNA-questionnaires contain a variety of items: open questions (e.g. item K11) and items featuring predefined answers such as rating scales (e.g. item K09) or a multiple choice format (e.g. item K08). These different item formats produce different types of data, which require different methods of data analysis.

Open questions produce written statements. For the analysis of this verbal data the method of Qualitative Content Analysis (QCA) by Mayring (2007) was used. This method allows for a strictly rule-based categorization of content and requires a well-defined set of categories. The development of these categories can either be driven by a theory ("top-down") or be derived from the verbal material itself ("bottom-up"). For this user survey we chose a bottom-up approach: content categories were extracted directly from the verbal data in order to reflect an unbiased user perspective. For the sake of vividness we also quote individual statements in the report. These citations are indicated by quotation marks followed by the participant's individual code (e.g. "It was fun (participating)" ANKA43).

Quantitative data produced by multiple-choice items and ratings was processed using Excel 2010 (descriptive analysis, graphs) and SPSS® 20 Statistics (exploratory factor analysis). Exploratory factor analysis was conducted to examine how different underlying constructs (e.g. worriedness) influence the responses of participants to a number of measured variables (e.g. items of the UNA-questionnaires). Factor analysis is performed by interpreting the pattern of correlations between the observed measures: Measures that are highly correlated (either positively or negatively) are most likely influenced by the same constructs, while those that are not correlated are likely to be driven by different constructs.

3. PRIMARY USERS AND RELATIVES

3.1 Description of User Samples

The primary user sample from Austria (n=63) comprises 34 female and 29 male subjects aged between 60 and 101 years. Table 2 shows the distribution of male and female participants across the three predefined age groups. These figures are shown in relation to the demographic distribution of these features. The sample of potential primary users from Austrian comprises:

- 21 solitarily living and 41 non-solitarily living individuals (1 missing value),
- 43 individuals from urban and 19 subjects from rural areas (1 missing value)

The sample of relatives from Austria (n=29) consists of 19 female and 10 male subjects aged from 28 to 90 years. In total the Austrian sample of relatives and confidants comprises 5 tandems.

Primary Users	**Age Group 60 - 69**		**Age Group 70 - 79**		**Age Group 80+**	
	male	female	male	female	male	female
Demographics of Austria	48 % (n = 11)	52 % (n = 12)	44 % (n = 7)	56 % (n = 9)	32 % (n = 4)	68 % (n = 7)
Sample Composition	**n = 12**	**n = 10**	**n = 12**	**n = 8**	**n = 5**	**n = 16**

TABLE 2: Composition of the Austrian primary user sample in terms of age and gender

The primary user sample from Catalonia (n=50) comprises 28 female and 22 male subjects aged between 60 and 88 years. Table 3 shows that the distribution of male and female participants across the three predefined age groups corresponds to the demographic distribution of these features. Moreover the Catalan sample is perfectly balanced in terms of:

- solitarily living (n=25) and non-solitarily living (n=25) persons
- individuals from urban (n=25) and rural (n=25) areas

The sample of relatives and confidants from Catalonia (n=50) consists of 34 female and 16 male participants aged between 27 and 78 years. The Catalan sample contains a total of 6 tandems.

Primary Users	Age Group 60 - 69		Age Group 70 - 79		Age Group 80+	
	male	female	male	female	male	female
Demographics of Catalonia (Spain)	48% (n = 11)	52% (n = 11)	44% (n = 8)	56% (n = 11)	32% (n = 3)	68% (n = 6)
Sample Composition	**n = 11**	**n = 11**	**n = 8**	**n = 11**	**n = 3**	**n = 6**

TABLE 3: Composition of the Catalan primary user sample in terms of age and gender

The primary user sample from Germany (n=96) comprises 64 female and 32 male participants aged between 60 and 92 years. It comprises:

- 41 solitarily living and 53 non-solitarily living persons (2 missing values),
- 24 individuals from urban and 71 subjects from rural areas (1 missing value)

The sample of relatives and confidants from Germany (n=86) consists of 60 female and 26 male subjects. Age of the participants ranges from 28 to 85 years. The German sample of relatives includes a total of 45 tandems.

Primary Users	Age Group 60 - 69		Age Group 70 - 79		Age Group 80+	
	male	female	male	female	male	female
Demographics of Germany	48 % **(n = 12)**	52 % **(n = 12)**	43 % **(n = 7)**	57 % **(n = 10)**	29% **(n = 3)**	71 % **(n = 6)**
Sample Composition	**n = 10**	**n = 15**	**n = 15**	**n = 28**	**n = 7**	**n = 21**

TABLE 4: Composition of the German primary user sample in terms of age and gender

The primary user sample from Italy (n=50) comprises 28 female and 22 male subjects aged between 59 and 90 years.[1] Table 5 shows that the distribution of male and female participants across the three predefined age groups corresponds to the demographic distribution of these features. The Italian sample is balanced in terms of:

[1] One male subject aged 59 years was included into the Italian primary user sample.

- solitarily living (n=24) and non-solitarily living (n=25) individuals
- individuals from urban (n=26) and rural (n=24) areas

The sample of relatives from Italy (n=50) consists of 40 female and 10 male participants aged from 23 to 70 years. It includes 25 tandems.

Primary Users	**Age Group 60 - 69**		**Age Group 70 - 79**		**Age Group 80+**	
	male	female	male	female	male	female
Demographics of Italy	47% (n = 11)	53% (n = 12)	42% (n = 8)	58% (n = 10)	33% (n = 3)	67% (n = 6)
Sample Composition	**n = 9**	**n = 12**	**n = 8**	**n = 11**	**n = 4**	**n = 5**

TABLE 5: Composition of the Italian primary user sample in terms of age and gender

Please note: Due to branches in the questionnaire and missing values the number of subjects included into data analysis may vary between items.

3.2 Social Needs of Elderly

In the field of AAL a strong emphasis is put on self-determination and independence of elderly people. Yet social interaction and the feeling of belonging to a valued group (e.g. family, neighborhood, religious community, chess club, etc.) are equally important for our psychological well-being as humans. Moreover, our needs for autonomy and affiliation are dynamically interrelated and cannot be treated as separate entities (Bischof, 1989). The ability to interact and communicate with members of a valued group adds to an elderly person´s notion of self-efficacy. As an elderly person's level of functioning is gradually decreasing, social bonds play an increasingly important role in stabilizing self-efficacy. Thus the relevance of affiliation for the resolution of elderlies' fears has to be taken into account.

Two open questions from the primary user questionnaire reflect the ambivalent role of autonomy and affiliation for the well-being of solitarily living elderly in general and their notion of self-efficacy in particular.

Item W09: What do you like about living solitarily? From a total number of 62 solitarily living elderly in the Austrian and the German primary user sample, 41 responded to this question.[2] For the analysis of this verbal data the method of Qualitative Content Analysis (QCA) by Mayring (2007) was used. This method allows for the rule-based interpretation of verbal data on the basis of a set of content categories.

A set of five categories was derived from the transcribed material: *Independence*, *Self-determination*, *Peace, Burden of single existence* and a rest category labeled *Other*. The category *Independence* accounts for statements that reflect a negative concept of freedom by pointing out avoidance goals ("no more responsibility for my husband in need for care" ADSA29). The second category label indicates statements which allude to a positive concept of freedom by stressing proactivity ("being one's own boss" AMBA31). A third category accounts for statements referring to tranquility of solitary life ("peace" MAJO27). Finally, the category *Burden of single existence* refers to those subjects who focused exclusively on the disadvantages of solitary life ("Nothing, unfortunately" ANJO21).

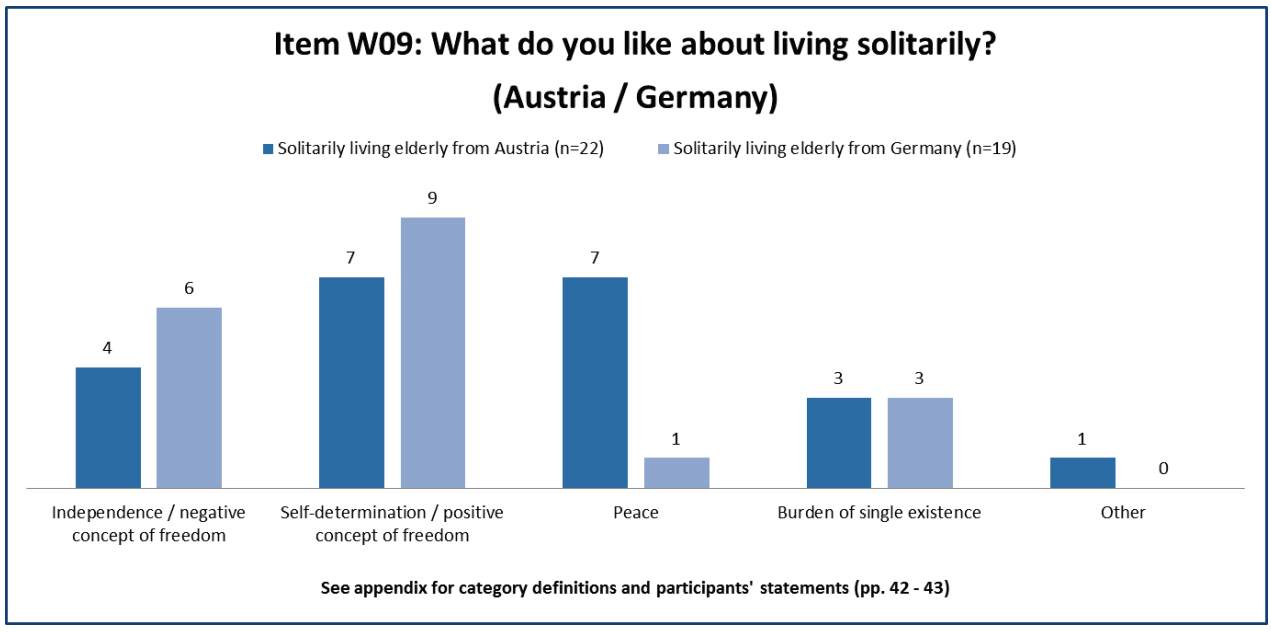

FIGURE 3: Frequencies of categories for Item W09

[2] Items W09 and W10 only appear in the Austrian and the German version of the primary user questionnaire. They were excluded from the Spanish, the Catalan and the Italian version in order to reduce the transcription effort for I2C, LIN and TES.

Item W10: What do you dislike about living solitarily? The answers to this open question were again analyzed by using the QCA (Mayring, 2007). Initially a set of four preliminary categories was derived from the transcribed material. These categories were labeled *Lack of communication, Lack of assistance, Lack of diversion* and *Other*. Due to the great variance in terms of distress expressed by the subjects ("conversational partners are missing" versus "threatening loneliness") we decided to further discriminate between two degrees of distress within each category. The revised categories were labeled *Lack of communication / Loneliness*, *Lack of assistance / Helplessness*, *Lack of diversion / Boredom* and *Other*.

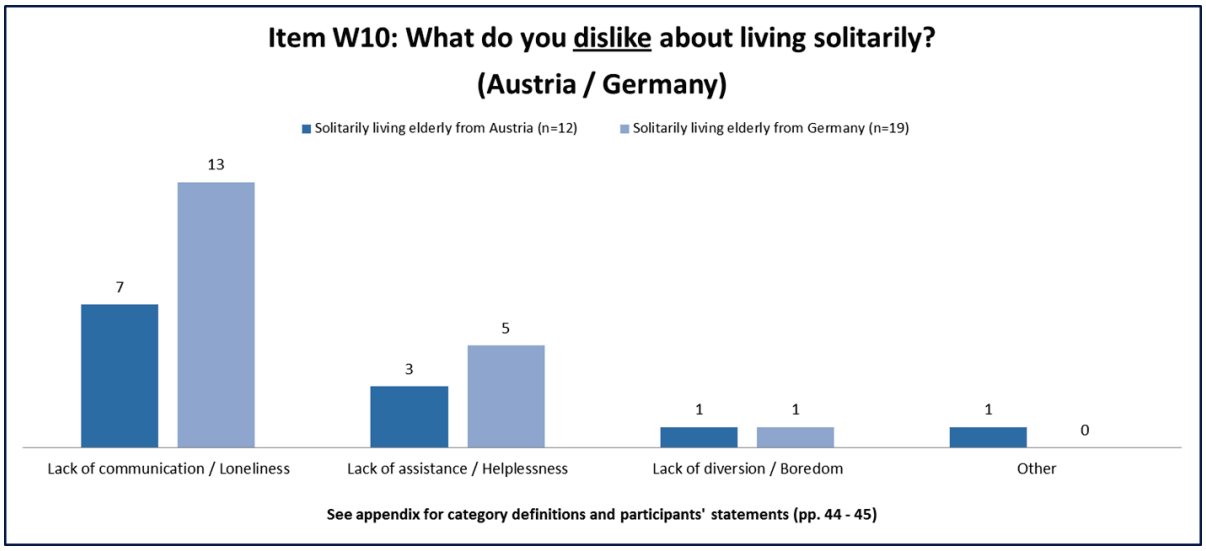

FIGURE 4: Frequencies of categories for Item W10

Solitarily living elderly experience lack of communication and loneliness. Many solitarily living elderly from Austria and Germany share the experience of "having nobody to talk" (MAJA40), "threatening loneliness" (ANFR26) and the fact that "beloved ones are missing" (MAJO27). In our sample 7 out of 12 statements from Austria and 13 out of 19 statements from Germany were allocated to the content category *Lack of communication / Loneliness*. In sum this category accounts for 58% of the answers in the Austrian sample and 68% of the answers given by German subjects.

Solitarily living elderly report lack of assistance and helplessness. A considerable number of solitarily living elderly from Austria and Germany report, that living alone means that "little help" (CEKA48) or even "no help" (BEJA27) is available and that they have "to take care of everything by [themselves]" (MAJA40). The corresponding category *Lack of assistance / Helplessness* shows the second most codings in both countries. It accounts for 25% of the answers in the Austrian sample and 26% of the answers given by German subjects.

Solitarily living elderly report lack of diversion and boredom. Last but not least, two elderly from Austria and Germany complained that a single life can be boring at times ("sometimes it's boring" MAFR42; "boring" ELAN26). An appropriate level of diversion from the potential monotony of everyday life is certainly critical for enjoying a single life.

How do these findings relate to the aims of the FEARLESS-project? It may sound contradictory, but the satisfaction of social needs is a prerequisite for enjoying independence and self-determination: Affiliation contributes to our sense of security. Thus if our ambient event detector has any negative side effect on the social networks of solitarily living users, it will not be effective in terms of reducing fears. The question is: How can we prevent such negative effects in the first place?

The ambient event detector should…

- ✓ **Allow for two-way communication:** Frequency of communication with friends or family members may decline (e.g. less visits; less phone calls) after an ambient event detector has been installed. The relatives of elderly people may see no need to contact them, knowing that they will be notified in case of an emergency. Telecare providers report high false alarm rates caused by clients in search of "somebody to talk". If the FEARLESS-system allows for primary users to contact or even interact with their relatives, they could actively compensate a decline in density of communication.
- ✓ **Avoid stigmatization:** Design and image of the FEARLESS-system must not allude to age-related deficits (e.g. frailty). Otherwise the event detector is likely to aggravate social withdrawal among elderly users: They might limit social activities in their home environment to avoid stigmatization – if they accept the system in the first place. Thus the design of the detector should either blend into the furnishing of the home or mimic other widely-used devices (e.g. smoke detector).[3]
- ✓ **Empower primary users:** Solitarily living elderly are prone to feelings of helplessness. Therefore we have to ensure that primary users can actively control and interact with the ambient event detector (e.g. interface providing information about the status of the system, reset the detector in case of a false alarm, switch off the ambient event detector). Otherwise primary users may experience a very painful loss of control over their home environment.

[3] These design aspects are of great importance especially for primary users suffering from dementias: In their home environment every device or piece of furniture which appears unfamiliar to them will cause discomfort.

3.3 Epidemiology of Falls

In the primary user questionnaire and the corresponding questionnaire for relatives a strong emphasis lies on biographical aspects related to falls. This chapter deals with two epidemiological aspects of falls: Firstly we report on the prevalence rates of falls in the three predefined age groups of our primary user sample and secondly we identify hot spots for severe falls in the home environment of elderly.

Prevalence of falls. The prevalence rate is an epidemiological term. It is used as an estimate of how common a health-related problem is within a certain population in a given period of time. In the overall primary user sample (n=259) users reporting at least one fall (n=116) and users reporting no falls (n=139) are well balanced. Figure 5 shows how the prevalence rates for falls are distributed across the three predefined age groups. The increasing number of users reporting falls is not following a linear trend: A slight increase of falls among “third agers” (users aged between 60 and 79 years) is contrasted by a strong increase between “third agers” and “fourth agers” (users beyond 80 years). These figures are consistent with the findings reported by Baltes and Smith (1999).

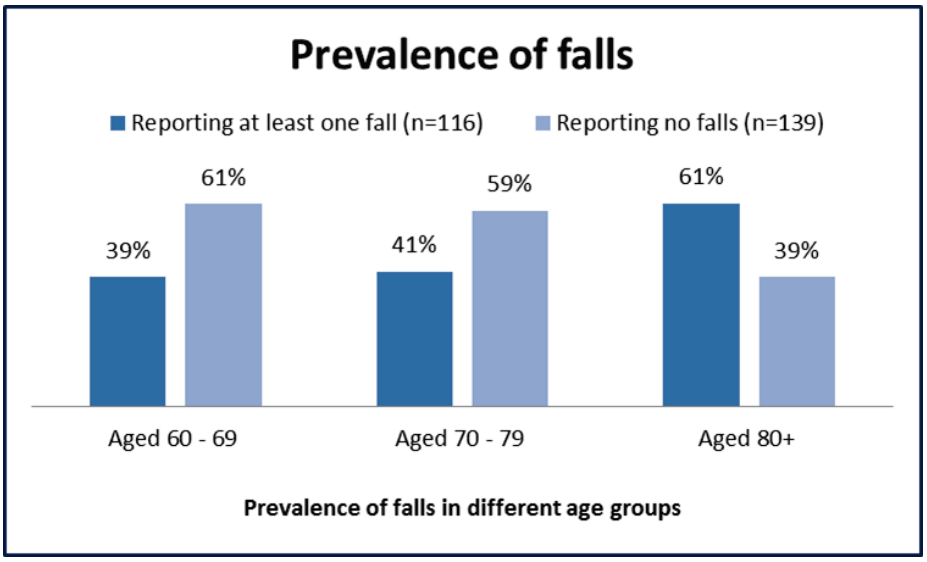

FIGURE 5: Distribution of falls across age groups (all countries)

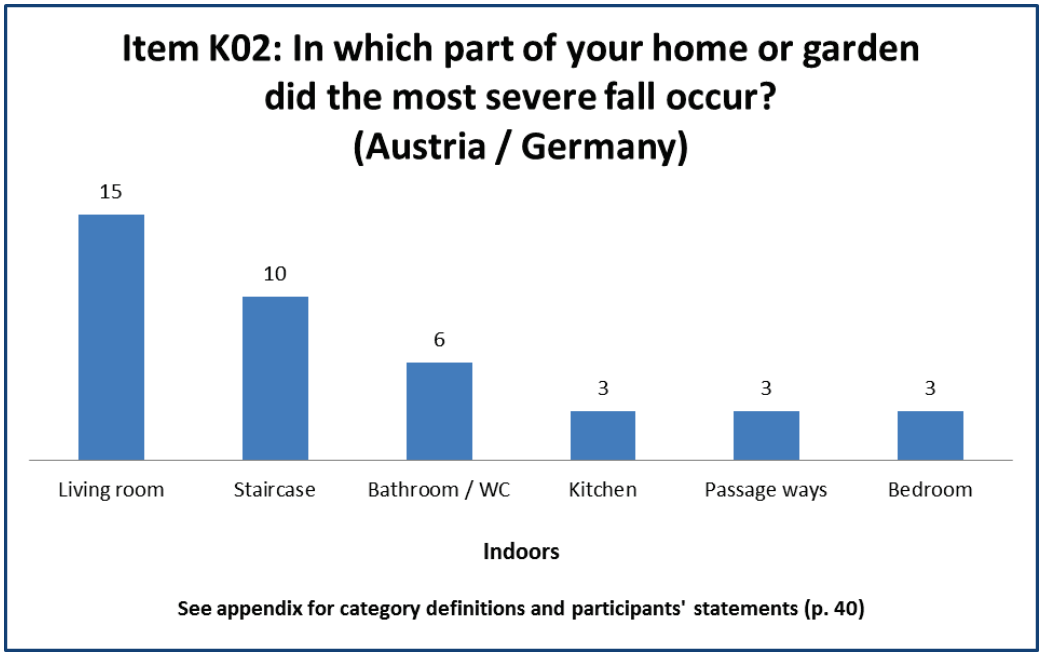

FIGURE 6: Frequency of severe falls indoors (Austria / Germany)

Item K02: In which part of your home or garden did the most severe fall occur? Out of 81 primary users from Austria and Germany who reported at least one fall (Item K01), 70 also responded to Item K02.[4] The answers to this open question were again analyzed using the QCA (Mayring, 2007). From the material itself a set of four global categories was extracted: *Indoors*, *Transition area, Outdoors* and *Other*. The *Indoors* category was subdivided into six minor categories which account for the different indoor locations mentioned by the participants (e.g. *Living room*, *Kitchen*, *Bathroom / WC*, etc.). A category labeled *Transition area* was defined for falls occurring in the immediate vicinity of the home ("on the stairway to the entrance" MAFR31). The *Outdoors* category was also refined by two subcategories: *Garden / Yard* and *Public space*. Finally the category *Other* accounts for statements that cannot be allocated otherwise (e.g. "no falls with fractures so far." AMBA31).

About 60% of falls reported by primary users from Austria and Germany occurred indoors. In the Austrian and German primary user sample a majority of severe falls occurred indoors.

Indoors over 75% of falls occurred in the living room, on the stairs or in the bathroom. Surprisingly most of the severe falls occurred in the living room followed by the staircase and the bathroom respectively the WC. The high rate of severe falls in the living room can be attributed to

a phenomenon called “concentration of control” which was first described by Lawton (1989): According to Lawton elderly people tend to limit their range of activity to a favorite place in their home where all of their most frequently used objects are at hand (e.g. TV remote control, reading glasses, portable telephone, medication, etc.). The living room is predestinated to become such a “control center” (Oswald, 1996). The more time elderly users spend around their “control center” the more likely it is that this is the place where a fall will occur.

In the indoor area the kitchen, the bedroom and passage ways (e.g. “in the corridor” ERMA31) were also mentioned as sites of a severe fall.

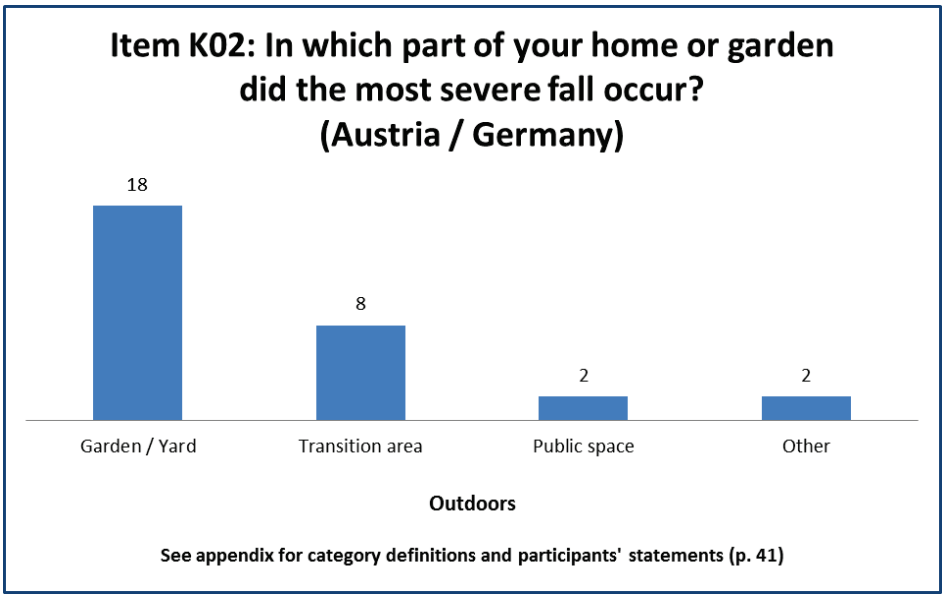

FIGURE 7: Frequency of severe falls outdoors (Austria / Germany)

Around 40% of falls reported by primary users from Austria and Germany occurred outdoors. The survey data from Austria and Germany shows that a considerable number of severe falls take place outside of the primary users’ home.

Outdoors over 85% of falls occurred in the garden or transition areas. In the exterior areas of the home environment, severe falls are most likely to occur in the garden or the transition zone between garden, public space and home (e.g. “stairs in front of the house” GUHA49): In sum the two content categories *Garden / Yard* and *Transition area* account for more than 85% of these critical incidents.

[4] Items K02 and W10 only appear in the Austrian and the German version of the primary user questionnaire. They were excluded from the Spanish, the Catalan and the Italian version in order to reduce the transcription effort for I2C, LIN and TES.

How do these findings relate to the aims of the FEARLESS-project? Five hot spots for severe falls could be identified: garden or yard, living room, stairs, bathroom or WC and areas at the vicinity of garden, public space and home.

The ambient event detector should…

- ✓ **Be apt for indoor and outdoor use:** Among primary users we have identified a definite need for fall detection in the outdoor area – above all in the garden. Focusing on indoor fall detection might even have a negative side effect on primary users in terms of mobility: Users at risk may limit their activities to the indoor area, if fall detection is not available in the garden around the house.
- ✓ **Be adapted to special conditions of "hot spots":** In any case the ambient event detector has to be adapted to special conditions of hot spots in the home (e.g. if it is used in the bathroom it has to be water and heat resistant).
- ✓ **Account for control centers:** If an elderly person has a preferred spot in his or her home (e.g. chair at the kitchen table, armchair in front of the TV, etc.) where he or she spends most of the time, this area might need special attention in terms of fall detection (e.g. an additional sensor unit).

3.4 Fears and Worries of Elderly and Relatives

What do we mean by fear? Fear is an aversive, object-related (unlike anxieties) but nonetheless vital emotion that can be described on three levels:

a) **Behavioral aspects:** avoidance behavior which is observable (e.g. an elderly person limiting physical activities to avoid falls)

b) **Physiological aspects:** fear is associated with a high level of tension (e.g. increase of heart rate and transpiration, shallow respiration).

c) **Cognitive aspects:** worries i.e. troubling thoughts concerning possible negative consequences of actions (e.g. an elderly person anticipating the severe consequences of a femoral neck fracture).

These three levels of fear are dynamically interrelated: An increase of the heart rate may trigger a troubling thought ("Something is wrong with me!") and vice versa. In the primary user questionnaire and the corresponding questionnaire for relatives we assess *worries* related to falls and other types of critical incidents.

Critical Incidents. Are falls really the most troubling incidents for elderly users and their relatives? Which events should the projected event detector cover in order to meet primary and secondary users' needs? Both UNA-questionnaires for primary users and relatives contain ten descriptions of critical incidents in everyday life (e.g. suffering a stroke, falling, housebreaking, etc.). Primary users and their relatives were asked to rate these events on a five-stepped rating scale. Its endings were labeled "does not worry me" and "worries me very much". On the basis of these items we can discern the most troubling events for primary users and their relatives within this predefined set of events.

Primary users and relatives from Austria worry most about strokes, falls and fires. In the Austrian sample, primary users and their relatives are well agreed what suffering a stroke and falls in the bathroom is concerned. They also agreed in terms of fires caused by defective electrical devices or neglected hotplates.

Primary users also worry about housebreaking. One discrepancy between the average ratings of primary users and relatives is apparent: Unlike their relatives, primary users also tend to worry about housebreaking.

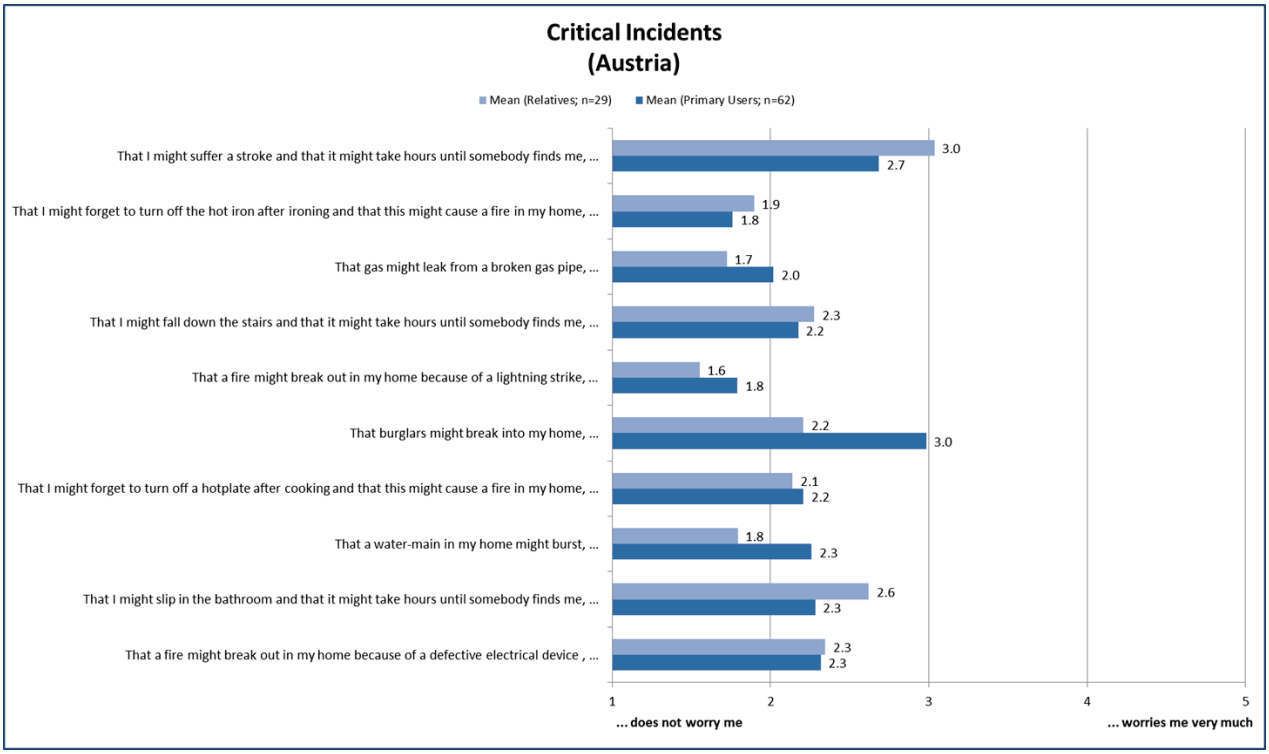

FIGURE 8: Average ratings of critical incidents for Austria

Primary users and relatives from Catalonia worry most about housebreaking, strokes, falls and fire. In the Catalan sample, primary users and their relatives are well agreed in terms of the most troubling event: housebreaking. Apart from burglars, primary users and their relatives fear strokes or falls in the absence of others as well as fires.

Relatives from Catalonia also worry about the forgetfulness of primary users. There are apparent discrepancies between the average ratings of primary users and relatives in terms of critical events caused by forgetfulness or memory loss. Unlike the elderly subjects themselves, their relatives fear that primary users might forget to turn off a hot plate or a hot iron and that this might cause a fire.

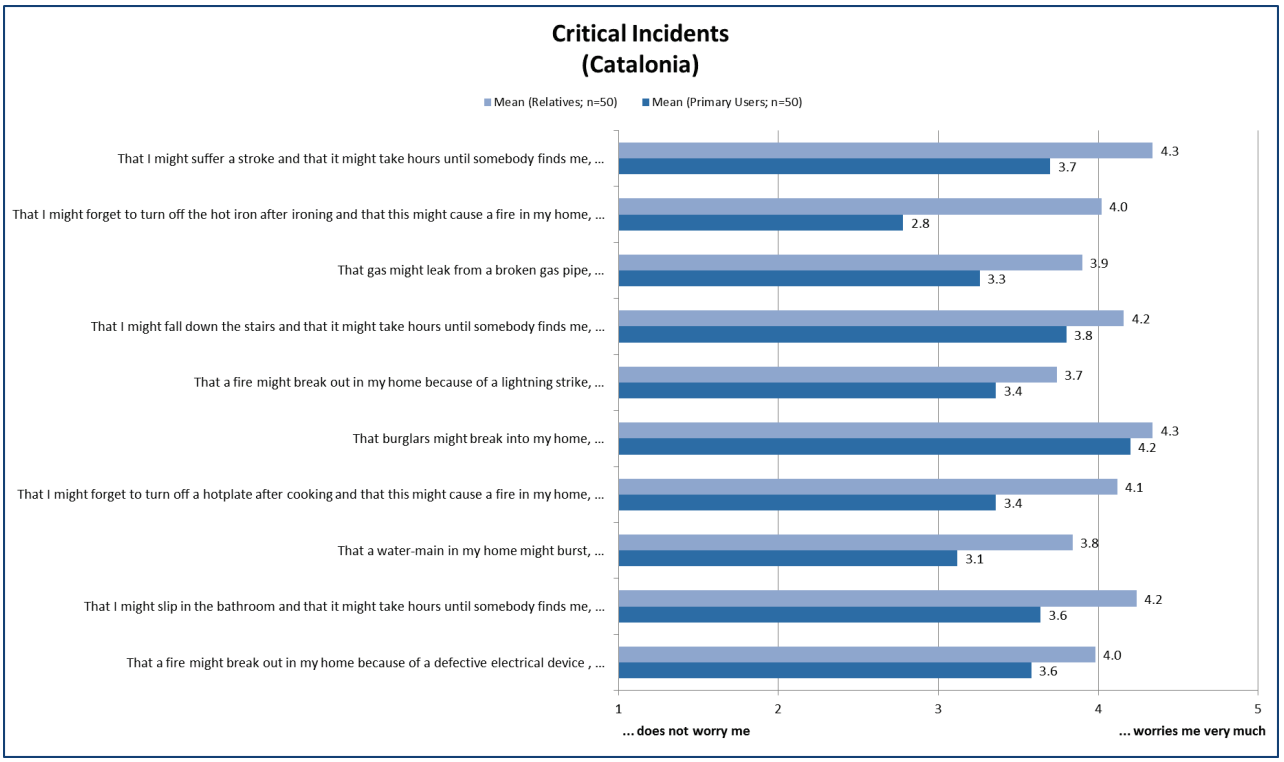

FIGURE 9: Average ratings of critical incidents for Catalonia

Independent from age the overall level of worrying among subjects from Catalonia is high. In the Catalan samples the average level of worries across all of the ten scenarios is relatively high compared with the other samples of our multi-cultural user survey.

The average ratings of relatives exceed the average ratings of primary users. Among participants from Catalonia the average ratings of relatives systematically exceed the average ratings of

primary users across all scenarios. As relatives were questioned in face-to-face interviews, these discrepancies might be induced – or at least intensified – by social desirability.[5]

Primary users and relatives from Germany worry about events indicating a deterioration of health. In the German sample, primary users and their relatives are well agreed in terms of the most troubling events: suffering a stroke and falls in the absence of others display the highest average ratings among primary users and relatives alike.

Primary users from Germany also worry about housebreaking, fire and inundation. On average primary users worry more about housebreaking, fire and inundation than their relatives.

Among primary users and relatives from Germany the overall level of worrying is low. Across all of the 10 scenarios the general level of worries is rather low in both samples from Germany. Only one of the average ratings lies beyond 3.0.

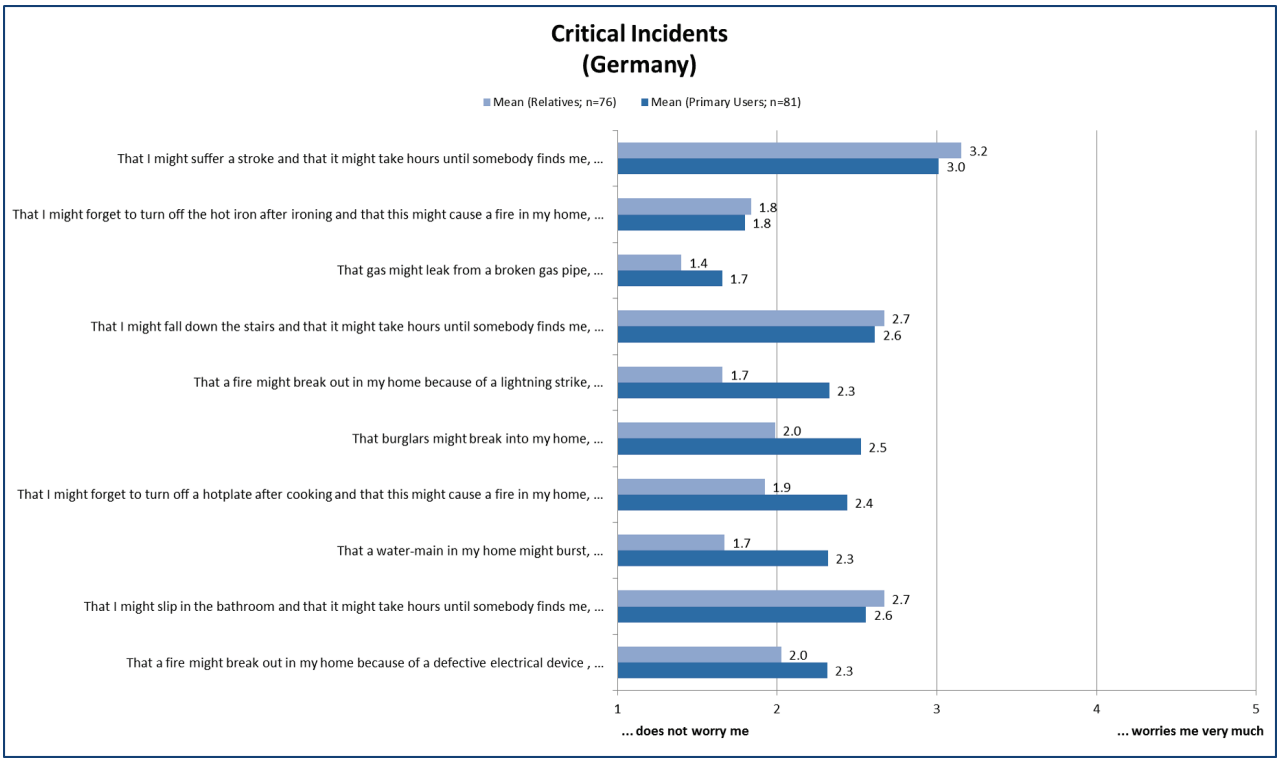

FIGURE 10: Average ratings of critical incidents for Germany

[5] The *social desirability bias* is a tendency of respondents to answer questions in a manner that will be viewed favorable by others.

Users from Germany display two distinct groups of worries: health-related worries and worries related to material damage. An explorative factor analysis was conducted to identify underlying constructs that influence the ratings of critical incidents by subjects from Germany (n=158). Two factors were extracted: The first factor summarizes the fear of suffering a stroke, the fear of falling in the bathroom and the fear of falling down the stairs. We labeled this factor with the term "health-related worries". The second factor accounts for the remaining seven scenarios and was interpreted as "worries related to material damage". This result denotes that people from Germany discriminate between two broad categories of worries: On the one hand they worry about health issues and on the other hand they worry about their acquired property.

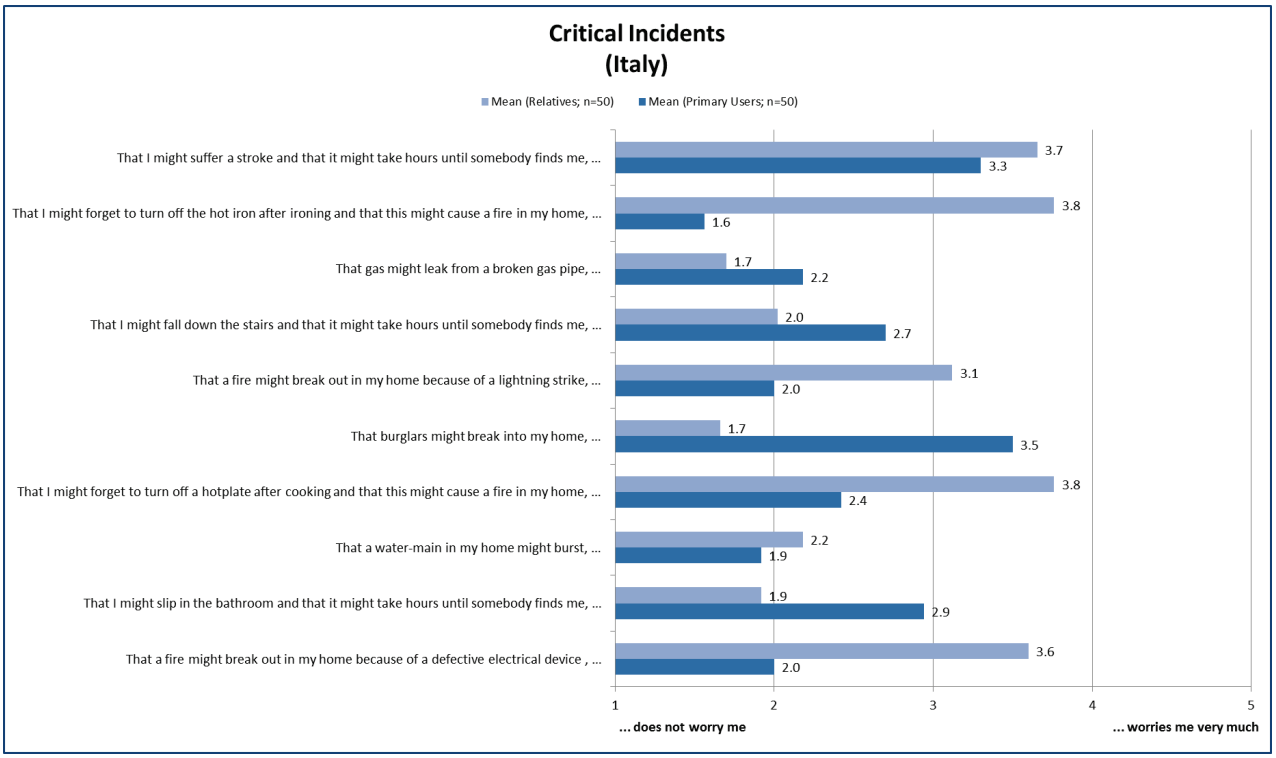

FIGURE 11: Average ratings of critical incidents for Italy

Primary users and relatives from Italy worry about strokes. Suffering a stroke is the only threat that is rated highly by primary users and relatives alike. Apart from this communality primary users and relatives display two distinct profiles.

For primary users housebreaking, strokes and falls are the most worrying events. On average primary users from Italy worry more about housebreaking and falls than secondary users.

Relatives worry most about fire and the forgetfulness of primary users. In the Italian samples the average ratings of primary users and relatives differ greatly in terms of critical events caused by forgetfulness or memory loss. Unlike the elderly subjects themselves, relatives fear that primary users might forget to turn off a hot plate or a hot iron and that this might cause a fire. Relatives also worry more about fires caused by a defective electric device or lightning strike.

The average ratings of primary users and relatives differ greatly. At first sight Figure 11 reveals some large scale differences between the perspectives of primary users and relatives. These discrepancies can be explained by the fact that - except for one pair of data sets - primary and secondary user samples from Italy are not linked by tandems.

For relatives from different cultures the two categories of worries were confirmed: Relatives either worry about events indicating a deterioration of health (e.g. falls) or they worry about material damage (e.g. flooding). An exploratory factor analysis was conducted for the entire data of the UNA-survey (n=474). It revealed the same two factors for relatives but only one single factor for primary users. It seems as though primary users do not discriminate between categories, if they have worries at all: They simply worry or they do not – independently from a given scenario. By contrast, secondary users discriminate between worries related to "health" and worries related to "material damage" if they worry about their elderly relative.

How do these findings relate to the aims of the FEARLESS-project? Across cultures, age groups and user perspectives suffering a stroke and falling in the absence of others are considered to be the most worrying events. For primary users from all cultures fire is a prevalent fear. Apart from these commonalities the profiles of the four cultures are quite divers. In Austria, Catalonia and Italy primary users are very worried about housebreaking. In sum, secondary users either worry about dangers to the health of their elderly relative or they worry about the material needs of their elderly relative. By contrast, primary users either worry about anything or nothing.

The ambient event detector should…

- ✓ **Reduce fears of elderly <u>and</u> relatives in terms of dangers to health:** The projected event detector has to effect a noticeable reduction of fears in terms of falling and other events indicating a deterioration of health (e.g. strokes, heart attacks).
- ✓ **Reduce fears of elderly <u>and</u> relatives in terms of material damage:** The event detector should also effect a noticeable reduction of fears related to material damage.

3.4 Desired Functions for an Ambient Event Detector

Which functions should an ambient event detector provide in order to meet the demands of elderly people and their relatives? In the primary user questionnaire and the corresponding questionnaire for relatives eight possible features for an innovative “event detector” were listed (s. Item T04). The subjects were asked to indicate those features that would meet their needs.

Primary users and relatives from Austria appreciate a fall detector which is capable of detecting longer periods of inactivity as well as smoke. The current data form Austria displays a clear profile in terms of desired features: A majority of primary users and relatives appreciates a device which allows for the detection of falls and longer periods of inactivity.

Primary users would also appreciate a motion detector which can serve as a burglar alarm and a light switch. Besides the detection of falls and other indicators for a deterioration of health, primary users from Austria are interested in the detection of housebreakings. About 50% would also appreciate a light switch which is automatically triggered by motion.

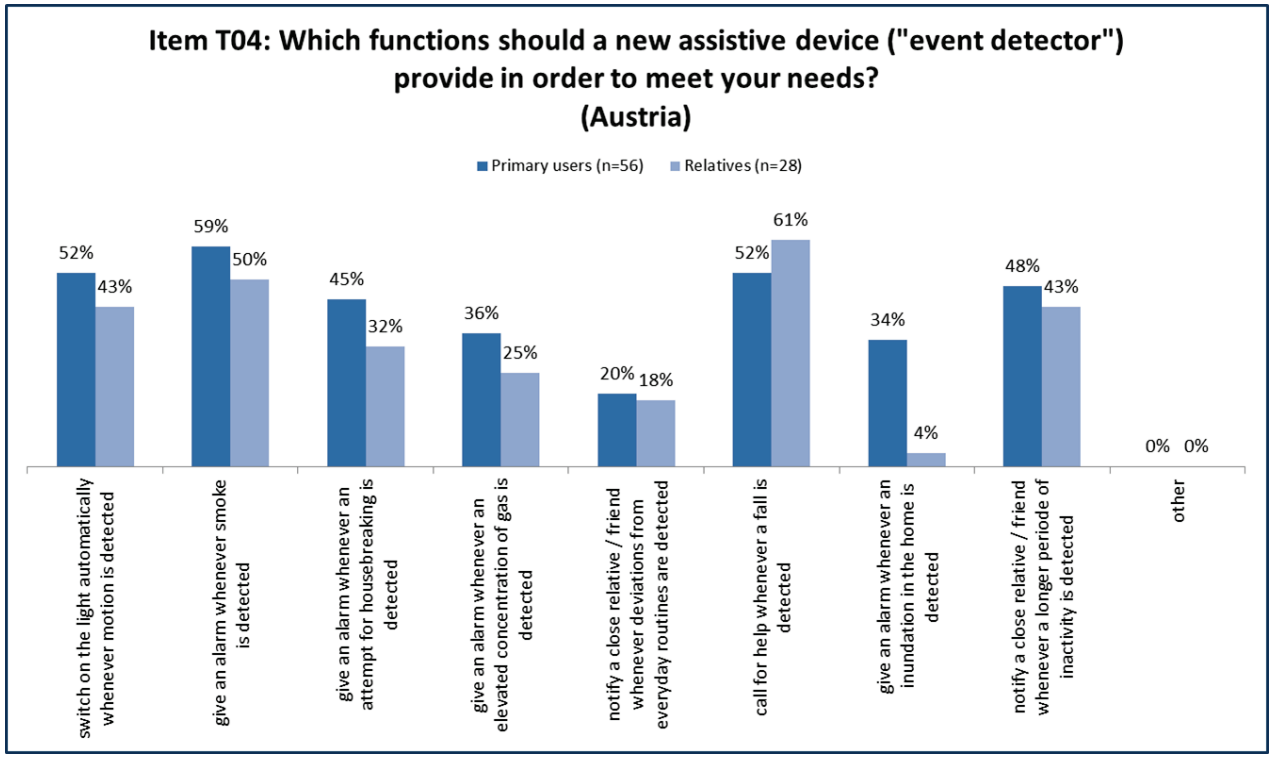

FIGURE 12: Desired features for an ambient event detector for Austria

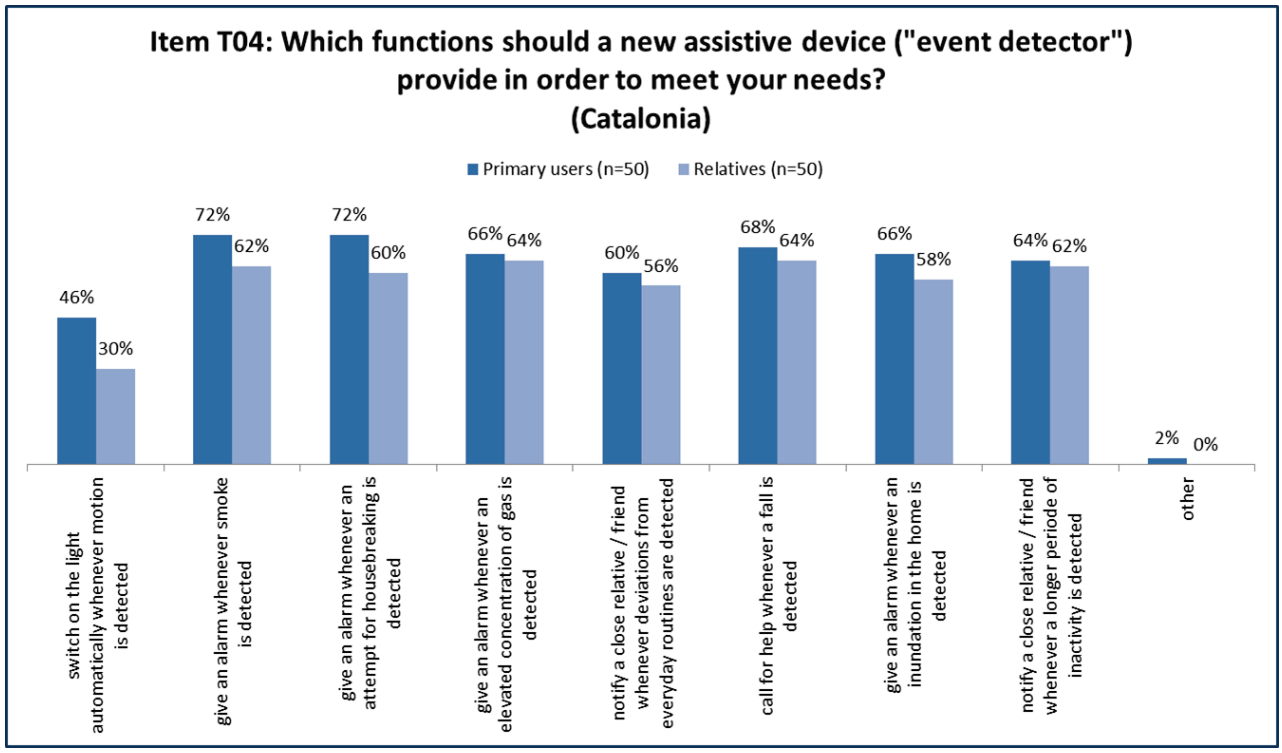

FIGURE 13: Desired features for an ambient event detector for Catalonia

Primary users and relatives from Catalonia appreciate a burglar alarm equipped with sensors for falls, fire, flooding, and gas detection. Due to the high average level of worrying ("ceiling effect") it is hard to discern a clear profile for Catalonia: A majority of primary users and relatives would appreciate all of the features listed except for "switch on the light automatically whenever motion is detected". Interestingly the "light switch triggered by motion" is the only suggested function that is associated with comfort – not with an emergency. This exception indicates that the answer pattern is not profoundly biased by a global tendency of appreciation.

Users from Germany appreciate a smoke detector equipped with sensors for fall detection and the detection of longer periods of inactivity. Based on a low average level of appreciation a clear feature profile can be derived: A majority of primary users and relatives expects the "event detector" to detect falls, smoke as well as longer periods of inactivity.

Primary users would also fancy an automatic light switch and a burglar alarm. In addition a considerable number of primary users from Germany fancies a combination of motion detectors which turn on the light automatically and which can detect attempts of housebreaking.

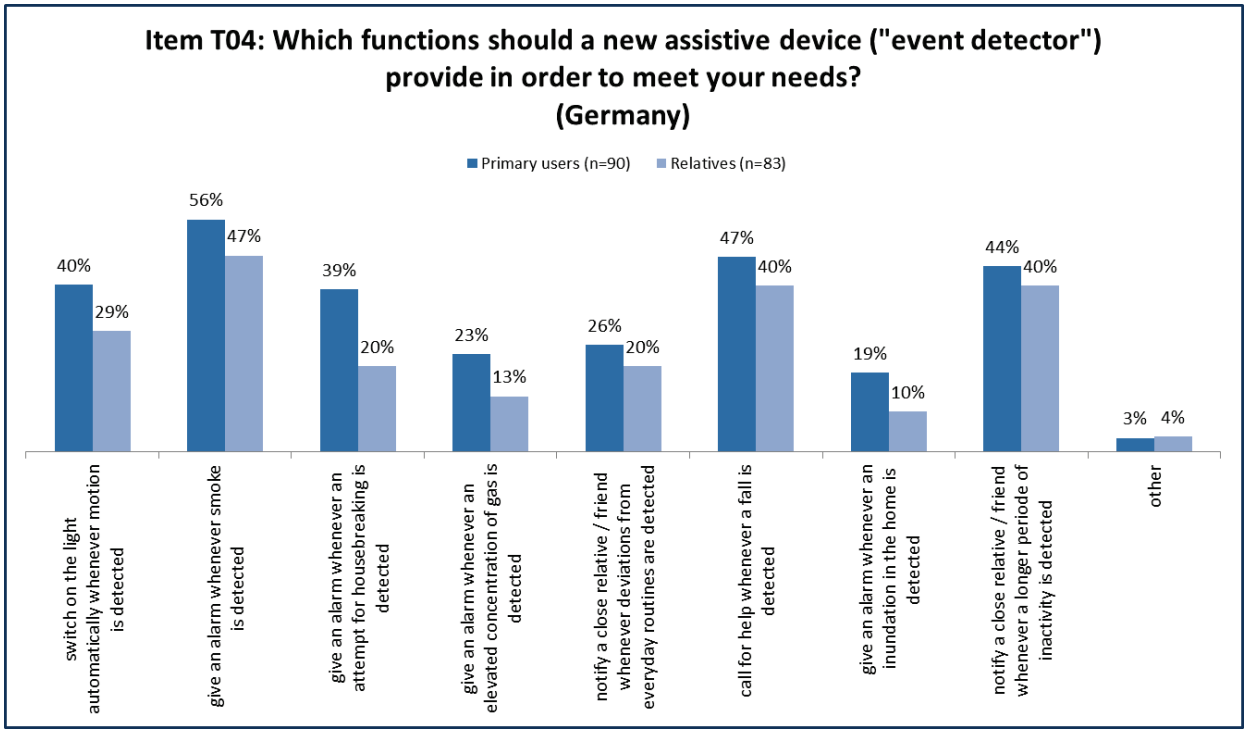

FIGURE 14: Desired features for an ambient event detector for Germany

Users from Italy clearly favor a combination of a fall detector and a burglar alarm with additional sensors for gas detection. For primary users and relatives alike a clear feature profile can be derived: A majority expects the event detector to cover falls, housebreaking and gas leakage.

Relatives from Italy also fancy a device for fire detection. In addition a considerable number of secondary users from Italy would appreciate a smoke detector.

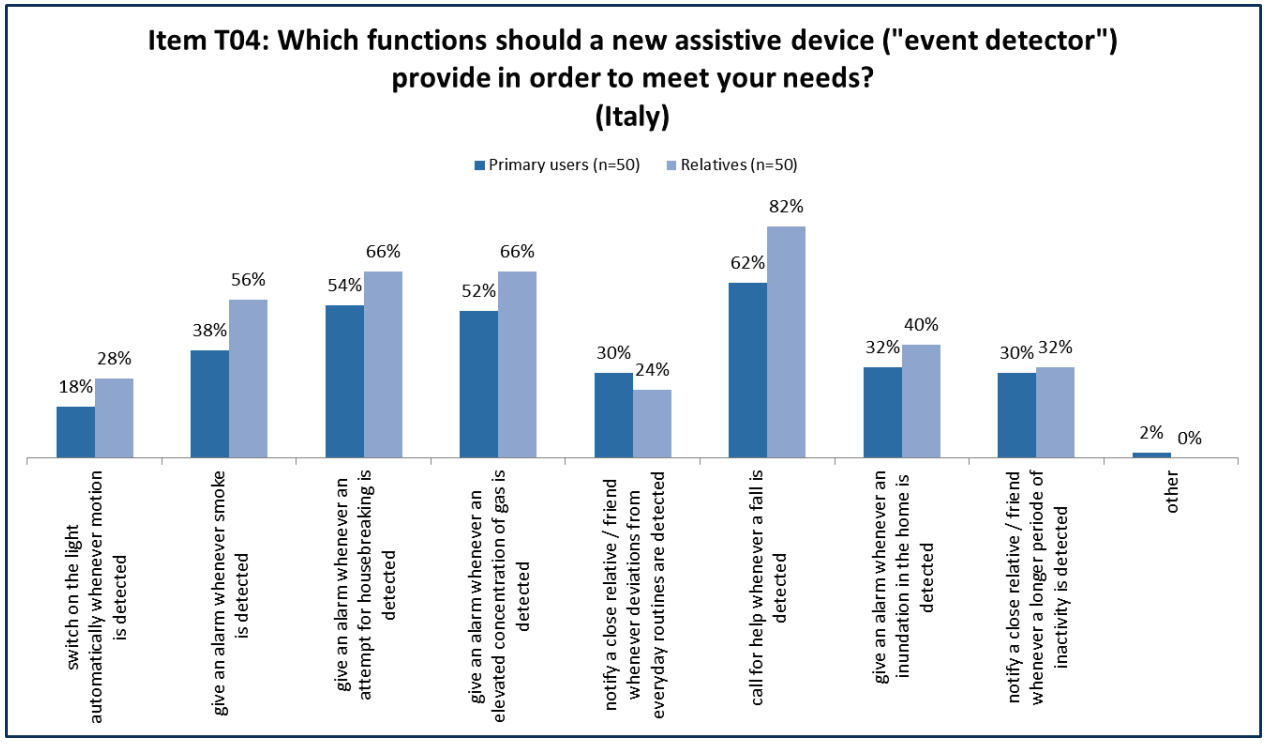

FIGURE 15: Desired features for an ambient event detector for Italy

How do these findings relate to the aims of the FEARLESS-project? Two basic functions for an ambient event detector could be identified: Detection of falls and fire detection. In this respect a considerable number of users from Austria, Catalonia and Italy were agreed. In addition primary and secondary users from Catalonia and Italy would also appreciate an integrated burglar alarm. In Germany fire detection was clearly favored only by primary users.

The ambient event detector should…

- ✓ **Detect falls and other events indicating a deterioration of health (e.g. strokes, heart attacks, seizures, etc.)**
- ✓ **Detect fires (e.g. heat, smoke emission, etc.)**
- ✓ **Allow for upgradeability:** The ambient event detector should allow for upgrades in terms of additional features that are tailored to the specific demands of certain user groups. For instance a burglar alarm would be appreciated by users from Catalonia and Italy.

	Austria		Catalonia		Germany		Italy	
	Elderly	Relatives	Elderly	Relatives	Elderly	Relatives	Elderly	Relatives
Fall detection	**X**	**X**	**X**	**X**	(x)	(x)	**X**	**XX**
Inactivity monitoring			**X**	**X**	(x)	(x)		
Fire detection	**X**	**X**	**XX**	**X**	**X**	(x)		**X**
Burglar alarm			**XX**	**X**	(x)		**X**	**X**
Flooding			**X**	**X**				
Gas detection			**X**	**X**			**X**	**X**
Monitoring of daily routines			**X**	**X**				
Light triggered by motion	**X**				(x)			

(x) = functions appreciated by at least 30% (only applied to German samples)

X = functions appreciated by at least 50%

XX = functions appreciated by at least 70%

TABLE 6: Most appreciated functions for an ambient event detector

3.5 Financial Aspects

How much money are primary users and relatives willing to spend on an ambient event detector? On a monthly basis, how much money would they spend on telecare services related to this device? Both questions were addressed in both UNA-questionnaires (s. item T09 and T10). As an estimate for best pricing the median values are reported. The median is defined as the numerical value separating the higher half of a sample from the lower half. In our case: 50% of the participants would be willing to spend more money and 50% would spend less. Due to the apparent skewness of distributions the median is a better estimate than the mean average.

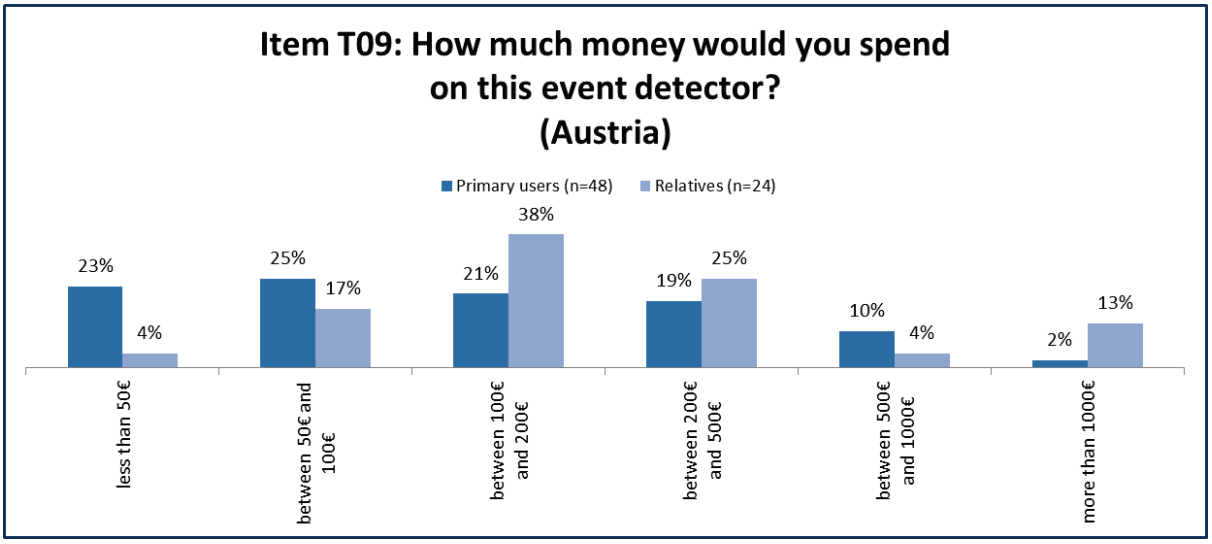

FIGURE 16: Initial expenses for an ambient event detector (Austria)

In Austria relatives are willing to spend more money on hardware than primary users. The current data suggests that relatives from Austria are willing to spend more money on an ambient event detector than primary users. The median value for primary users lies between 50€ and 100€, for relatives it lies between 100€ and 200€. Whether this effect also applies to monthly expenses for services related to the ambient event detector (e.g. stand-by for emergency duties) cannot be determined on the basis of the available survey data. The median for both groups shows that monthly costs for telecare services should not exceed 50€.

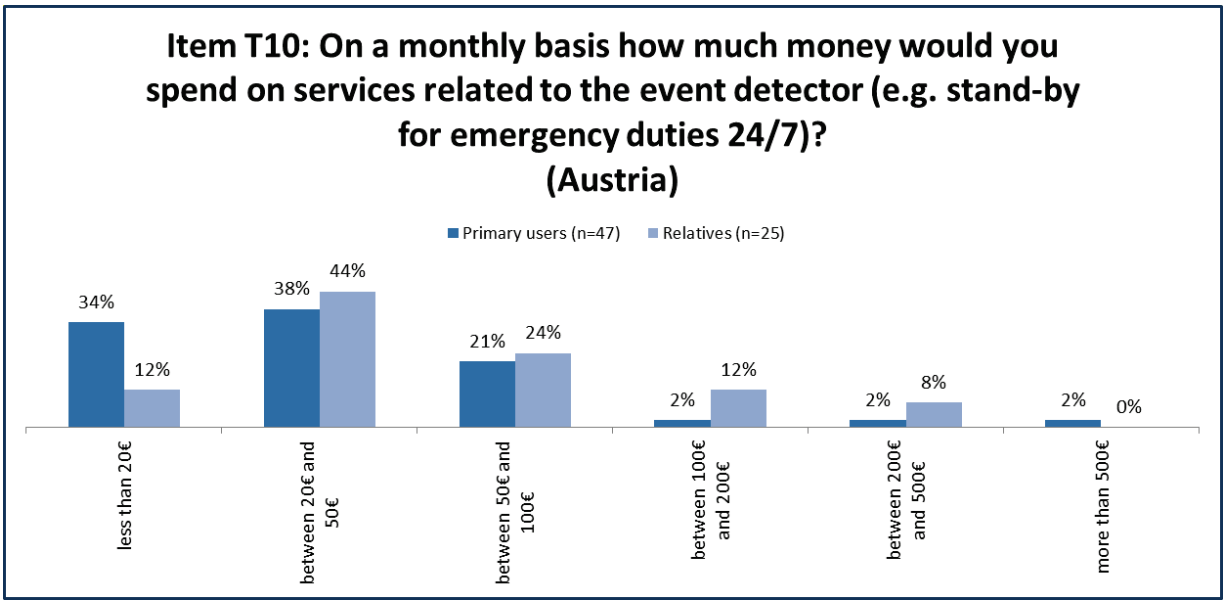

FIGURE 17: Monthly expenses for telecare services (Austria)

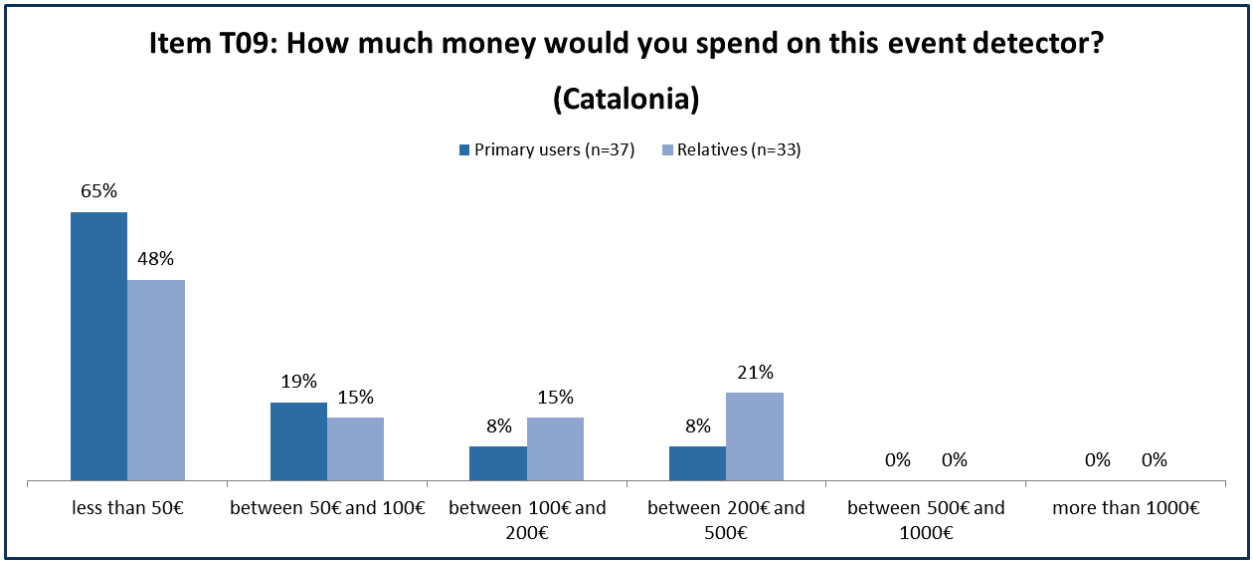

FIGURE 18: Initial expenses for an ambient event detector (Catalonia)

In Catalonia relatives are willing to spend more money on hardware than primary users. Figure 18 indicates that relatives from Catalonia are willing to spend slightly more money on an ambient event detector than primary users. The median for primary users lies below 50€, for relatives it lies between 50€ and 100€. Whether this effect also applies to monthly expenses for services related to the ambient event detector cannot be determined on the basis of the available survey data. The median for both groups shows that monthly costs for telecare services should not exceed 20€.

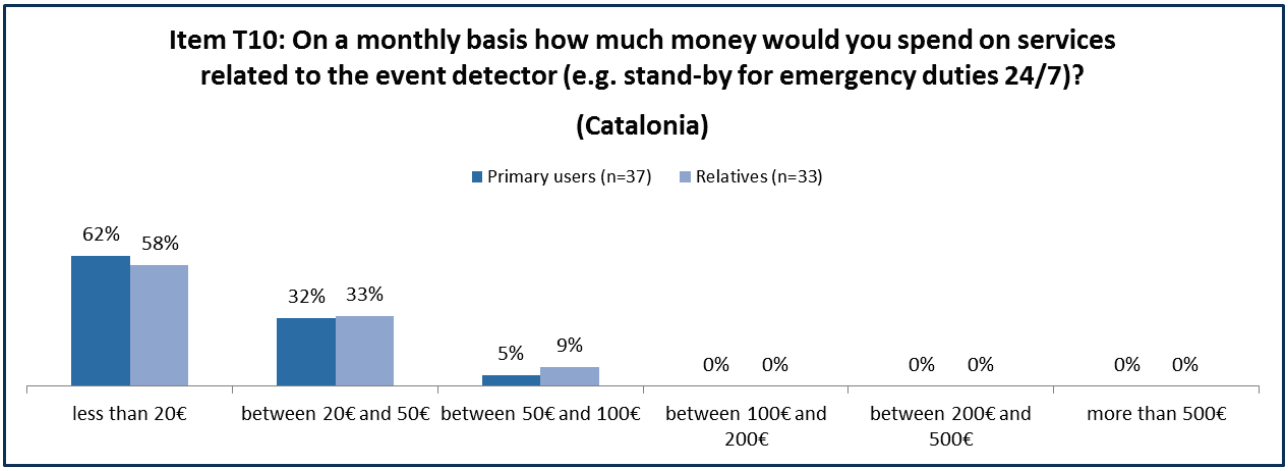

FIGURE 19: Monthly expenses for telecare services (Catalonia)

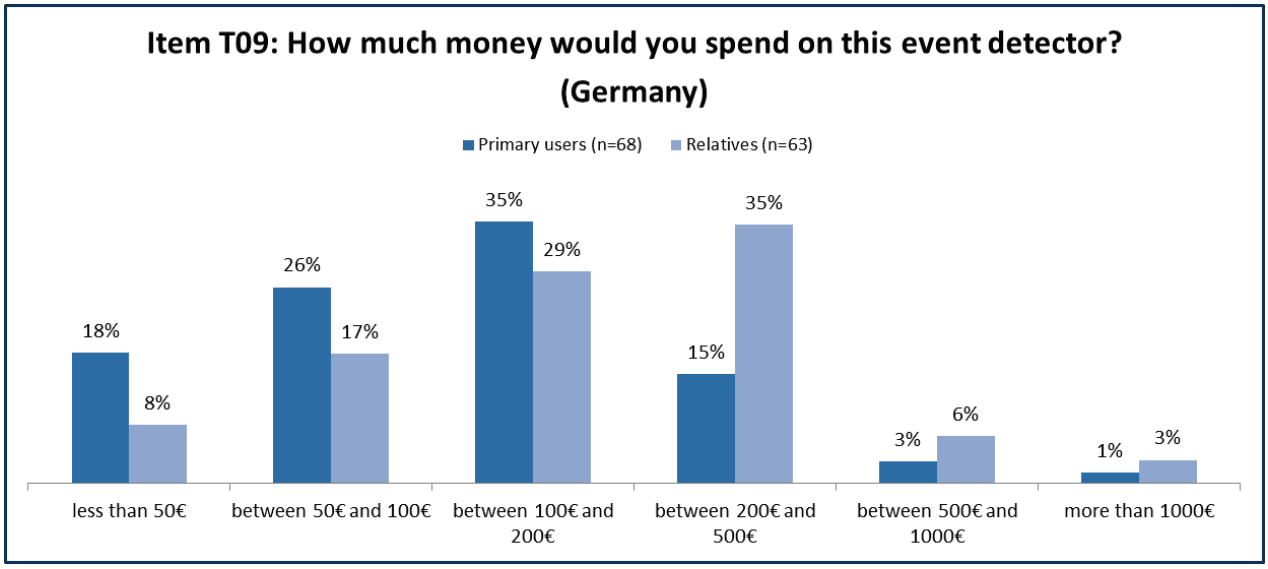

FIGURE 20: Initial expenses for an ambient event detector (Germany)

In Germany relatives are willing to spend more money on hardware than primary users. Figure 20 indicates that relatives from Germany are willing to spend more money on an ambient event detector than primary users, although the median for both user groups lies between 100€ and 200€. Whether this effect also applies to monthly expenses for services related to the ambient event detector (e.g. stand-by for emergency duties) cannot be determined on the basis of our survey data. For both user groups the median value lies between 20€ and 50€.

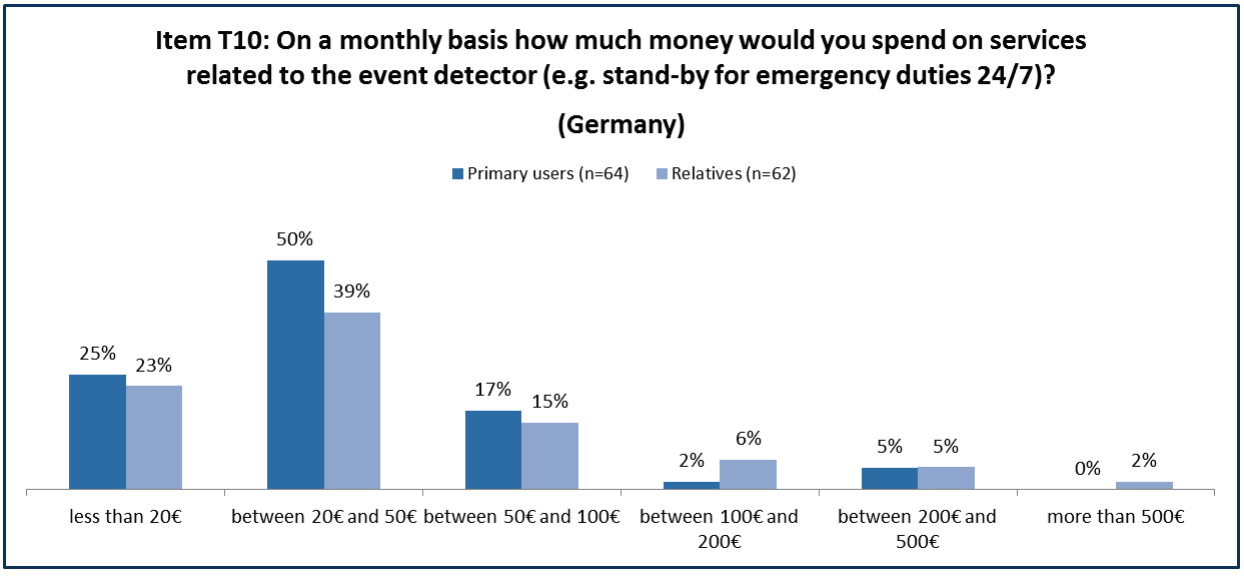

FIGURE 21: Monthly expenses for telecare services (Germany)

In Italy relatives are willing to spend more money on hardware than primary users. Figure 22 suggests that relatives from Italy are also willing to spend more money on an ambient event detector than primary users. Nevertheless the median values for both groups lie below 50€. Concerning monthly costs for services, the median values for primary users and relatives lie below 20€.

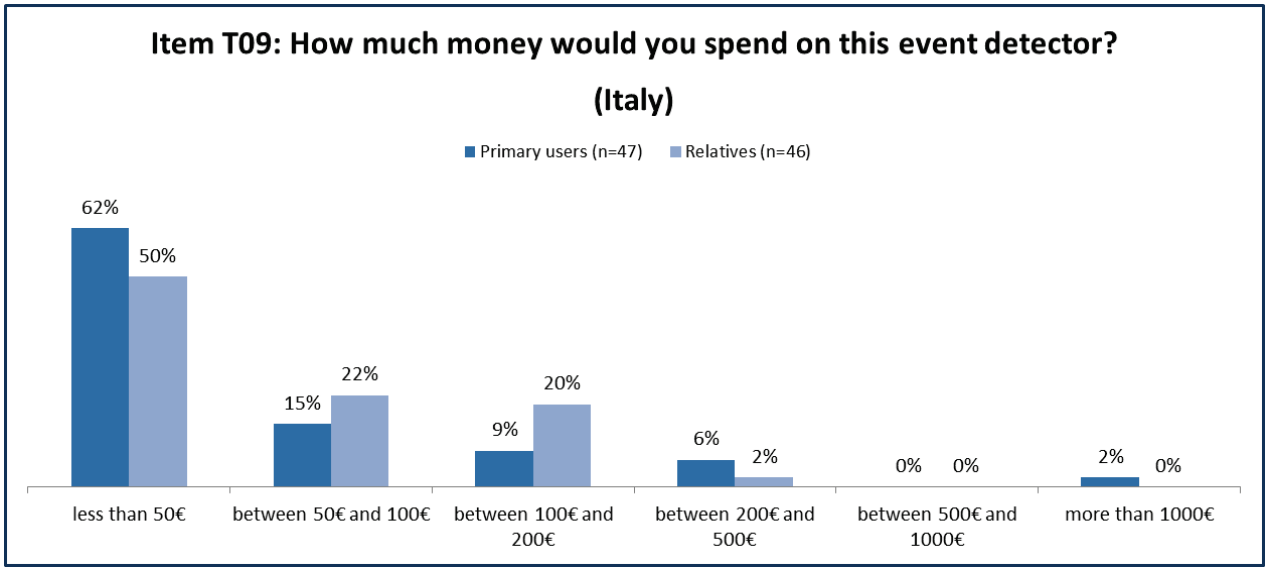

FIGURE 22: Initial expenses for an ambient event detector (Italy)

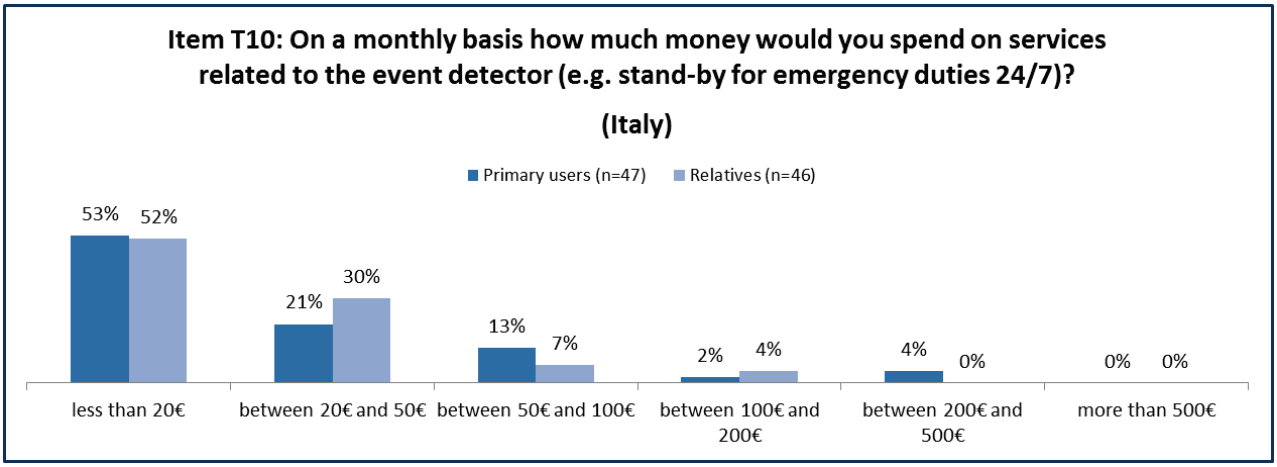

FIGURE 23: Monthly expenses for telecare services (Italy)

How do these findings relate to the aims of the FEARLESS-project? Across all four countries we found that relatives are probably willing to invest more money in the hardware of an ambient event detector than primary users. The hardware should be less than 200€ and monthly expenses for services related to the event detector should not exceed 50€.

The ambient event detector should…

- ✓ **Be affordable:** „I appreciate this study if it leads to assistive devices that are affordable for elderly people" (ADSA29).
- ✓ **Cost less than 200€** and monthly expenses for telecare services should not exceed 50€.

4. SUMMARY

For the European AAL-JP-Project FEARLESS a multi-cultural user needs analysis was conducted in Austria, Catalonia (Spain), Germany and Italy. People aged 60+ (n=259) and their relatives (n=215) were i.e. questioned about their state of health, their current living conditions, previous falls and fears related to a broad variety of critical incidents. Participants were also asked to specify preferred functions and pricing for a custom-tailored ambient event detector.

Qualitative and quantitative research methods were applied to identify the most important needs of elderly people and their relatives. Here is a brief summary of our findings:

Satisfaction of social needs is a prerequisite for enjoying independence and self-determination: A notion of social support adds to our sense of security. If the projected ambient event detector has any negative side effect on the social networks of its elderly users, it will not be effective in terms of reducing fears. In the course of the upcoming field pilots the impact of the FEARLESS-system on social networks of its test users have to be examined.

Maintenance of control is a general prerequisite for psychological well-being. For elderly people the home environment is a crucial source of certainty and control in a rapidly changing world. The FEARLESS-system should feature a user interface which allows for control and transparency.

Maintenance of mobility is a basic aim of the FEARLESS-project. Among primary users there is a definite need for fall detection in the outdoor area – above all in the garden. Focusing on indoor fall detection might constrain the activity range of primary users: Elderly at risk may limit their activities to the indoor area, if fall detection is not available in the garden around the house.

In all four cultures **events indicating a deterioration of health** (e.g. falls, longer periods of inactivity) and **fires** were perceived as particularly threatening by primary users and relatives alike. Apart from these commonalities, users from Italy and Catalonia are also worried about **housebreaking**.

Last but not least the FEARLESS-system should take **financial limitations of primary users** into consideration. Affordability could be an important argument for using a well-established sensor technology such as Microsoft® Kinect®. This particular sensor technology could also prevent social stigmatization, as it displays a juvenile image associated with activity and joy. Moreover it can serve as a gateway for training purposes (e.g. Microsoft® Xbox 360®) and facilitate two-way communication.

5. CHECKLIST

Primary user requirements	The projected ambient event detector should…	How do we account for this requirement?
Maintenance of social networks	• **Allow for two-way communication** between primary user and relatives • **Avoid stigmatization**	…… ……
Maintenance of control beliefs	• **Empower primary users** to control and interact with the ambient event detector • **Make relevant information visible** for the user (e.g. status of the system)	…… ……
Maintenance of mobility around the house	• **Be apt for fall detection indoors and outdoors** (e.g. garden, control center, stairs, bathroom)	…… ……
Critical incidents	• **Reduce fears of elderly and relatives in terms of health hazards** such as falls strokes, seizures, etc. • **Reduce fears of elderly and relatives in terms of material damage** (e.g. fires)	…… ……
Desired features	• **Detect falls and indicators for serious health problems** (e.g. strokes, heart attacks, etc.) • **Detect fire** (e.g. heat and smoke emission) • **Allow for upgrades** (e.g. burglar alarm for users from Catalonia and Italy)	…… ……
Awareness for financial limitations	• **Be affordable** for elderly with little income • **Cost less than 200€** (monthly expenses for services should not exceed 50€)	…… ……

6. REFERENCES

BALTES, P. B., & SMITH, J. (1999). *Multilevel and systemic analyses of old age: Theoretical and empirical evidence for a fourth age*. In V. L. Bengtson & K. W. Schaie (Eds.), Handbook of theories of aging (pp. 153-173). New York: Springer.

BISCHOF, N. (2001): *Das Rätsel Ödipus. Die biologischen Wurzeln des Urkonfliktes von Intimität und Autonomie*. München: Piper.

LAWTON, M.P. (1989): *Environmental Proactivity in Older People*. In Bengston, V.L., Schaie, K.W. (Eds.), The Course of Later Life (pp.15 – 24). New York: Springer.

MAYRING, P. (2007). *Qualitative Inhaltsanalyse. Grundlagen und Techniken*. Weinheim: Deutscher Studien Verlag.

OSWALD, F. (1996). *Hier bin ich zu Hause. Zur Bedeutung des Wohnens: Eine empirische Studie mit gesunden und gehbeeinträchtigten Älteren*. Regensburg.

WAHL, H.-W. (2001). *Ecology of aging*. In N. J. Smelser & P. B. Baltes (Eds.), International encyclopedia of the social and behavioral sciences (pp. 4045-4048). Amsterdam: Elsevier.

WAHL, H.-W. & GITLIN, L. N. (2007). *Environmental gerontology*. In J. E. Birren (Ed.), Encyclopedia of gerontology: Age, aging, and the aged (pp. 494-501). Oxford: Elsevier.

7. APPENDIX

Item K09: In which part of your house or garden did the most severe fall occur?						
Category Label	INDOORS					
Category Definition	The subcategories of this category account for statements which refer to places inside of the user's home.					
Subcategory Label	Living room	Staircase	Bathroom / WC	Kitchen	Passage ways	Bedroom
Subcategory Definition	This category accounts for statements that indicate that the fall occurred in the **living room** of the user´s home	This category accounts for statements that indicate that the fall occurred on the **stairs** of the user´s home	This category accounts for statements that indicate that the fall occurred in the **bath or the WC** of the user´s home	This category accounts for statements that indicate that the fall occurred on the **kitchen** of the user´s home	This category accounts for statements that indicate that the fall occurred in a **hallway or corridor** of the user´s home	This category accounts for any statement which **cannot be allocated to any other category**
Standard Example	"in the living room" (MAAU29)	"in the staircase" (LUJO36)	"in the bathroom, in the WC" (JOFR25)	"in the kitchen" (MAHE24)	"in the corridor" (ERMA31)	"bedroom" (CÄJO26)
Codings	"living room" (13x)	"in the staircase" (FRJO33)	"bath" (2x)	"kitchen" (ALVA10)	"in the hallway" (ANFR26)	"bedroom" (CHER32)
	"in the living area" (ADSA29)	"while climbing stairs" (POGE21)	"in the bath" (MAJO43)	"cleaning [the kitchen]" (FRRU36)	"hall" (CEKA48)	"in my room" (HEPI29)
		"stairs of the house" (GUHA49)	"WC, bath" (KUSL39)			
		"stairs" (6x)	"toilet" (DOHA39)			
Number of Codings	**15**	**10**	**6**	**3**	**3**	**3**

Item K09: In which part of your house or garden did the most severe fall occur?				
Category Label	**TRANSITION AREA**	**OUTDOORS**		**OTHER**
Subcategory Label	This category accounts for statements that indicate that the fall occurred **in the entrance area or right outside the entrance of the user´s home or garden**	Garden / Yard	Public space	This category accounts for any statement which **cannot be allocated to any other category**
Subcategory Definition		This category accounts for statements that indicate that the fall occurred **in the garden, the yard or on the terrace of the user´s home**	This category accounts for statements that indicate that the fall occurred **in public space**	
Standard Example	"on the stairs at the entrance" (MAFR31)	"in the garden (hillside)" (MAAL34)	"getting out of the car = sidewalk/street" (AGPH31)	"no falls with fractures so far" (AMBA31)
Codings	"entrance area" (KRSO22)	"in the garden hanging up the laundry" (ANJO40)	"2x in the street" (MAKA45)	"working area" (SOKA37)
	"entrance of the house" (ADSA29)	"terrace" (HICL38)		
	"entrance of the staircase" (JOJO28)	"in the yard" (ELEC39)		
	"entrance of the staircase" (MAFR34)	"on the stairs in the garden" (MAER42)		
	"at the stairs to the house" (THJO38)	"garden" (4x) / "garden and [...]" (2x)		
	"entrance area – stairs" (ELAL44)	"lawn" (MAJO34)		
	"at the entrance of the house" (MAFR42)	"in the garden on my way to the house (glazed frost)" (ANKA43)		
		"at the boundary of a flower bed" (ANHO46)		
		"meadow" (BEJA27)		
		"in the garden of a former home" (FRMA38)		
		"in the garden trimming trees" (MAJO43)		
		"flower beds" (GEKO48)		
Number of Codings	**8**	**18**	**2**	**2**

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Item W09: What do you like about living solitarily?					
Category Label	Independence	Self-determination	Peace	Burden of single existence	Other
Category Definition	This category accounts for statements that reflect a **negative concept of freedom** by pointing out **avoidance goals**	This category accounts for statements that reflect a **positive concept of freedom** by pointing out **tangible goals** and / or expressing a strong **control belief**	This category accounts for statements referring to **tranquility of solitary life**	This category accounts for statements which reflect **deficit orientation** towards single life	This category accounts for any statement which **cannot be allocated to any other category**
Standard Example	"No obligations towards others" (MAAL34)	"Being one´s own boss" (AMBA31)	"It is quiet" (n.s.)	"Nothing, but I have no choice!" (CÄJO26)	"Familiar environment" (HERU36)
Codings	"Independent" (ELAN26)	"I can live as I please" (ZIER39)	"Solitude" (JOFR25)	"Nothing" (ANFR26)	
	"Do not have to be considerate of others" (ROKA19)	"Self-sufficiency" (JOJO28)	"Peace" (MAJO27)	"Nothing" (MAJA40)	
	"No responsibility for anybody else" (AMBA31)	"I can sleep late" (n.s.)	"Peace" (ANJO29)	"Nothing, unfortunately" (ANJO21)	
	"and is not bothered by others" (HIOT30)	"Self-sufficiency" (MAKA45)	"Peace" (MAKA45)	"Nothing" (MAEH34)	
	"Independence" (CEKA48)	"Can do as I please" (HIHE52)	"Peace" (JOJO32)	"Nothing" (SOJO22)	
	"Independence" (LUJE31)	"Self-determined lifestyle" (ER7050)	"Peace" (ELJO43)		
	"Independence" (ADFR34)	"Self-sufficiency" (MARI28)	"Peace" (PAAN39)		
	"No more responsibility for my husband in need for care" (ADSA29)	"One has self-responsibility" (HIOT30)			

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Item W09: What do you like about living solitarily?					
Category Label	Independence	Self-determination	Peace	Burden of single existence	Others
Category Definition	This category accounts for statements that reflect a **negative concept of freedom** by pointing out **avoidance goals**	This category accounts for statements that reflect a **positive concept of freedom** by pointing out **tangible goals** and / or expressing a strong **control belief**	This category accounts for statements referring to **tranquility of solitary life**	This category accounts for statements which reflect **deficit orientation** towards single life	This category accounts for any statement which **cannot be allocated to any other category**
Standard Example	"No obligations towards others" (MAAL34)	"Being one´s own boss" (AMBA31)	"It is quiet" (n.s.)	"Nothing, but I have no choice!" (CÄJO26)	"Familiar environment" (HERU36)
Codings	"Independence" (INFR43)	"Can take care of myself" (AGPH31)			
		"All of my time is at my disposal" (ROEW39)			
		"I can do what I want" (BEJA27)			
		"Free to spend my time as I wish" (LIRO23)			
		"I can decide for myself what to do and what not to do" (MAHE24)			
		"Freedom to decide what to do and what not to do" (HEAL49)			
		"We can decide for ourselves" (MAER42)			
Number of Codings (Aus)	**4**	**7**	**7**	**3**	**1**
Number of Codings (Ger)	**6**	**9**	**1**	**3**	**0**
Total Number of Codings	**10**	**16**	**8**	**6**	**1**

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Item W10: What do you <u>dislike</u> about living solitarily?				
Category Label	Lack of communication / loneliness	Lack of assistance / helplessness	Lack of diversion / boredom	Other
Category Definition	This category accounts for statements that reflect social needs ranging from **lack of everyday communication** to a strong **feeling of loneliness**	This category accounts for statements which point out a **specific need for help** in terms of ADLs as well as a global **feeling of helplessness**	This category accounts for statements which reflect a **need for entertainment** as well as the expression of **boredom**	This category accounts for any statement which **cannot be allocated to any other category**
Standard Example	"Having nobody to talk" (MAJA40) "Threatening loneliness" (ANFR26)	"external help for heavy chores needed" (AMBA31)	"boring" (ELAN26)	"everything" (SOJO22)
Codings	"Loneliness" (MAAL34)	"and you have to take care of everything by yourself" (MAJA40)	"Sometimes it is boring" (MAFR42)	
	"Loneliness" (AGPH31)	"All of the work" (LUJE31)		
	"Being alone" (ROEW39)	"No help" (BEJA27)		
	"Lack of conversation" (ADFR34)	"Neighbors are often out of the house; feeling insecure on my own" (ADSA29)		
	"Loneliness" (ANJO21)	"Cannot leave the flat" (CÄJO26)		
	"Loneliness" (MAEH34)	"Little help" (CEKA48)		
	"No conversation" (LIRO23)	"Have to make all decisions on my own" (MAHE24)		
	"Sometimes loneliness" (MAKA45)			
	"Conversational partners are missing" (HIHE52)			
	"Loneliness, especially at the weekends" (ER7050)			

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Item W10: What do you <u>dislike</u> about living solitarily?				
Category Label	Lack of communication / loneliness	Lack of assistance / helplessness	Lack of diversion / boredom	Other
Category Definition	This category accounts for statements that reflect social needs ranging from **lack of everyday communication** to a strong **feeling of loneliness**	This category accounts for statements which point out a **specific need for help** in terms of ADLs as well as a global **feeling of helplessness**	This category accounts for statements which reflect a **need for entertainment** as well as the expression of **boredom**	This category accounts for any statement which **cannot be allocated to any other category**
Standard Example	"Having nobody to talk" (MAJA40) "Threatening loneliness" (ANFR26)	"external help for heavy chores needed" (AMBA31)	"boring" (ELAN26)	"everything" (SOJO22)
Codings	"Communication" (MARI28)			
	"No possibility to share joyful moments" (INFR43)			
	"No conversational partner" (HEAL49)			
	"Sometimes no conversational partner" (AMBA31)			
	"Loneliness on some days" (ROKA19)			
	"Beloved ones are missing" (MAJO27)			
	"No conversational partners" (JOOS22)			
	"Loneliness" (JOJO28)			
Number of Codings (Aus)	**7**	**3**	**1**	**1**
Number of Codings (Ger)	**13**	**5**	**1**	**0**
Total Number of Codings	**20**	**8**	**2**	**1**

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