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Towards direct and indirect measurement of mood-improving behaviors in nursing homes

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Inge Anna Hendrina Knippenberg
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Promotoren:
Prof. dr. D.L. Gerritsen
Prof. dr. J.J.D.M. van Lankveld, Open Universiteit

Copromotor:
Dr. R. Leontjevas

Manuscriptcommissie:
Prof. dr. A.E.M. Speckens (voorzitter)
Prof. dr. M. Smalbrugge, Amsterdam UMC
Prof. dr. P.J. de Jong, Rijksuniversiteit Groningen

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by

Inge Anna Hendrina Knippenberg
born on March 18, 1988
in Baexem, the Netherlands

Supervisors:
Prof. dr. D.L. Gerritsen
Prof. dr. J.J.D.M. van Lankveld, Open Universiteit

Co-supervisor:
Dr. R. Leontjevas

Manuscript Committee:
Prof. dr. A.E.M. Speckens (chair)
Prof. dr. M. Smalbrugge, Amsterdam UMC
Prof. dr. P.J. de Jong, University of Groningen

Don't let the old man in
I want to live me some more
Can't leave it up to him
He's knocking on my door

And I knew all of my life
That someday it would end
Get up and go outside
Don't let the old man in

Many moons I have lived
My body's weathered and worn
Ask yourself how old you'd be
If you didn't know the day you were born

Try to love on your wife
And stay close to your friends
Toast each sundown with wine
Don't let the old man in

When he rides up on his horse
And you feel that cold bitter wind
Look out your window and smile
Don't let the old man in

Toby Keith – Don't let the old man in

Contents

Introduction

Chapter 1

General introduction

This thesis addresses behaviors of nursing home residents, relatives, and caregivers that can contribute to improving resident mood. The studies reported in this thesis provide insights into specific mood-improving behaviors, how these behaviors can be measured using direct instruments (inventories), and how implicit associations with these behaviors can be assessed through indirect instruments (implicit association tasks). Furthermore, this thesis provides insight into the effect of priming caregivers with information about resident depression status on caregiver's implicit attitude and motivation towards mood-improving behaviors. Through these studies, this thesis aims to enhance the understanding and measurement of mood-improving behaviors in nursing homes and thereby contribute to improvement of depression care in these settings.

During the course of this project, an unexpected opportunity for further exploration occurred with the outbreak of the COVID-19 pandemic. To limit the spread of the virus, strict infection control measures were implemented in nursing homes (e.g., discontinuation of recreational activities and restriction on visits). While these measures were designed to protect residents' physical health, they also led to changes in environmental stimuli, providing a unique opportunity for an additional study exploring the perspectives of healthcare professionals on how changes in environmental stimuli can influence depressive symptoms in residents. Therefore, in addition to individual mood-improving behaviors, this thesis also considers the potential role of environmental stimuli in residents' mood, with the goal of further informing strategies for improving depression care in nursing homes.

Mood and depression

Mood plays an important role in overall well-being (Mitchell, 2021). Positive moods foster a sense of happiness and purpose, whereas mood disturbances can disrupt emotional stability and impair daily functioning (Mitchell et al., 2024). When such disturbances are persistent or severe, they may lead to depression, a common and serious mental health condition that poses a significant global challenge by profoundly impacting emotional well-being and daily life (Ferrari, Charlson, et al., 2013; World Health Organization, 2017).

Depression is characterized by persistent feelings of sadness, emptiness, or irritability, as well as a loss of interest or pleasure in activities, combined with physical and cognitive symptoms (American Psychiatric Association, 2022). These symptoms can range from mild to severe. Unlike temporary mood fluctuations related to everyday events, depression is marked by a sustained and profound shift in emotional state that impacts personal, social, and occupational life (American Psychiatric Association, 2022).

The severity, duration, and underlying causes of depressive disorders can vary. For example, persistent depressive disorder is characterized by chronic but relatively mild symptoms lasting at least two years, while major depressive disorder is marked by more severe symptoms persisting for two weeks or longer (American Psychiatric Association, 2022). The global prevalence of major depressive disorder in the general population is estimated at 4.7% (Ferrari, Somerville, et al., 2013). The etiology of depression can be complex, involving genetic, biochemical, and environmental factors. Depression frequently coexists with other conditions such as anxiety, substance abuse, and chronic pain (American Psychiatric Association, 2022).

To reduce the burden of depression, prevention, early diagnosis, and appropriate treatment are important. Timely interventions can reduce the impact of depression on overall health and daily functioning (Cuijpers, 2021; Halfin, 2007).

Depression in nursing home residents

In the Netherlands, 92% of adults aged 75 and older live independently at home, with assistance from home care services or family members when needed (Klerk de et al., 2019). However, increasing care needs—stemming from worsening physical health or cognitive decline—can make independent living challenging (Cipriani et al., 2020; Yong et al., 2021). In such cases, moving into a nursing home may become advisable. Nursing homes offer 24-hour care and support for individuals with complex healthcare needs and heightened vulnerability (Sanford et al., 2015).

In nursing homes, however, depression is a significant concern among older adults, where factors such as loss of independence, chronic illness, and social isolation contribute to high prevalence rates (Gilman et al., 2017; Kane et al., 2010; Sivertsen et al., 2015; Yong et al., 2021). Recent global meta-analyses highlight just how prevalent depression in nursing homes is: Jalali et al. (2024) estimate that 61% of residents experience depression (95% CI: 51–69), while Wang et al. (2024) report rates of 53% (95% CI: 46-60) for depressed mood and 27% (95% CI: 9-45) for major depressive disorder.

Similar findings have been observed in the Netherlands. Van Asch et al. (2013) found that 46% of nursing home residents with dementia and 23% of those without dementia experience depressive symptoms, as measured by the Minimal Data Set Depression Rating Scale (MDS-DRS score ≥ 3). The prevalence of diagnosed depressive disorders was around 10% in both groups (Van Asch et al., 2013). Boorsma et al. (2012) reported an incidence rate for diagnosed depressive disorder of 13.6 per 100 person-years in Dutch nursing homes. Furthermore, Leontjevas et al. (2013) reported that high scores on the Cornell Scale for Depression in Dementia (CSDD score >7) were observed in 52% (SD: 16) of residents in dementia special care units and in 41% (SD: 12) of those in somatic care units.

The high prevalence of depression among nursing home residents has important implications. It is associated with reduced quality of life and well-being (Sivertsen et al., 2015; van der Wolf et al., 2019) and increased mortality rates (Gilman et al., 2017; Kane et al., 2010). In addition to its impact on individual well-being, depression also results in considerable societal and economic challenges. These findings emphasize the urgent need for prevention and treatment strategies specifically designed to address depression among nursing home residents.

Depression care in nursing homes

Depression care in nursing homes typically involves pharmacotherapy, psychotherapy, and psychosocial interventions (Bharucha et al., 2006; Boyce et al., 2012; Burley et al., 2022; Cuijpers et al., 2021; Declercq et al., 2024; Vernooij-Dassen et al., 2010). However, these interventions have limitations. For example, pharmacological treatments often show limited efficacy, particularly for residents with dementia, and are frequently associated with poor adherence and undesirable side effects (Brown et al., 2002; Hartikainen et al., 2007; Nelson & Devanand, 2011). Additionally, cognitive impairments in residents can reduce the effectiveness of psychotherapeutic interventions (Rostamzadeh et al., 2022).

In the Netherlands, the 'Act in case of Depression' program was developed to provide a structured approach to managing depression in nursing homes through assessment, treatment, and monitoring (Leontjevas et al., 2013). While the program successfully reduced depression prevalence among residents in somatic wards, it was less effective for those in dementia special care units. These findings highlight the importance of exploring alternative strategies that can be easily tailored to a resident's specific needs and integrated into both caregiving practice and daily life.

Care environment and resident mood

Alongside formal interventions, the physical and social care environment can play a role in residents' mood. The stimulus-organism-response framework (Mehrabian & Russell, 1974) posits that environmental stimuli can affect an individual's internal state, which, in turn, may influence their emotional and behavioral responses. Within the care environment, these stimuli can be divided into targeted and untargeted stimuli.

Purposive (targeted) stimuli, such as organized activities and therapeutic programs, are intentionally designed to engage residents. In contrast, non-intentional (untargeted) stimuli, such as background noise from staff conversations or corridor activity, arise spontaneously from the (care) environment. Research suggests that the impact of these stimuli is not uniform and can vary based on residents' cognitive functioning and sensory sensitivity (Day et al., 2000; Garcia et al., 2012; Janus et al., 2020). For instance,

residents with dementia, who may be more susceptible to sensory overstimulation, may benefit from quieter environments with reduced untargeted stimuli. Conversely, residents without cognitive limitations may experience increased loneliness or apathy when stimulation is limited.

Understanding how environmental stimuli can affect resident mood is important for creating supportive care environments. By tailoring the level and type of stimulation to individual needs, care environments can be optimized to promote resident mood.

Mood-improving behaviors in nursing homes

While the care environment can be important to the residents' mood, individual interactions and behaviors within that environment can also make a meaningful contribution. In addition to formal treatments and environmental factors, informal behavioral strategies may influence resident mood. These strategies can include everyday interactions and behaviors of caregivers and residents, such as shared jokes, meaningful conversations, and comforting touches (Haugan et al., 2013; Meeks & Looney, 2011; Wu et al., 2020). Although such behaviors are not acknowledged as formal therapeutic interventions, they can have a positive impact on residents' mood. Integrating these practices into daily routines, either alongside or in the absence of formal treatments, holds considerable potential for improving the mood of nursing home residents.

Examples of mood-improving behaviors range from deliberate actions to spontaneous, intuitive gestures. For example, a caregiver might intentionally situate a resident near a window as a way of providing that person more natural light and a pleasant view, leveraging their likely mood-improving effects (Aries et al., 2015). Alternatively, a caregiver might intuitively use a calm or reassuring tone when speaking to a resident with depression. Identifying and exploring these behaviors is important for developing and refining tailored interventions that can complement formal treatments and enrich care practices in nursing homes.

Deliberate and intuitive cognitive processes

Dual-process theory (Kahneman, 2011) offers a useful framework for understanding how caregivers may engage in mood-improving behaviors through two types of cognitive processes: reflective (deliberate) and intuitive (automatic). Reflective processes involve intentional and logical decision-making, where caregivers consciously apply specific strategies learned from training or past experiences. In contrast, intuitive processes are fast and automatic, guiding more spontaneous behaviors. Intuitive processes may play an important role in caregiving, as caregivers may often rely on habitual responses in their daily interactions with residents (Börjesson et al., 2014;

Hellner & Norberg, 1994; Sandvoll, 2017). Exploring both reflective and intuitive processes can thus provide a more complete understanding of how to optimize caregiver behavior to positively impact resident mood.

Measuring mood-improving behaviors: direct and indirect approaches

To measure mood-improving behaviors, it is important to consider both the reflective and intuitive cognitive processes underlying these behaviors. This requires the use of both direct and indirect measurement instruments (Ranganath et al., 2008). Direct instruments, such as self-report questionnaires and interviews, are well-suited for capturing explicit reflective processes. These instruments allow participants to consciously reflect on and describe their behaviors. However, intuitive processes—which operate automatically—are more challenging to assess using direct methods. This is where indirect instruments become valuable.

Indirect instruments are designed to assess less conscious and more automatic cognitive processes through reaction-based tasks such as the Implicit Association Task (IAT), the Go/No-Go Association Task, and the Relational Responding Task. By analyzing reaction times to stimuli, these instruments aim to measure automatic evaluations (e.g., attitudes or motivations) on specific topics (e.g., race or mental health) that may subconsciously influence behavior (Greenwald et al., 2003). For example, faster responses to positive attributes paired with a target topic, compared to negative attributes paired with the same topic, suggest a stronger implicit positive association with the target topic in memory (Brownstein et al., 2019; De Houwer et al., 2009; Goodall, 2011).

These indirect measures can reveal preferences, biases, or motivations that caregivers may not consciously recognize but that still affect their interactions with residents. Combining both direct and indirect measurement approaches might thus allow for a more comprehensive understanding of the cognitive processes driving mood-improving behaviors in nursing homes.

Impact of resident depression status on mood-improving behaviors of caregivers

Research suggests that individuals adjust their interactions based on the emotional states of others (Marinetti et al., 2011). In nursing homes, the depression status of residents could influence caregivers' engagement in mood-improving behaviors. Studies have indeed indicated that caregivers adopt comforting behaviors when caring for residents with depression, such as speaking in soothing tones, offering gentle

physical reassurance, or providing emotional support through attentive listening and empathic communication (Bradshaw et al., 2022; Haugan et al., 2013).

However, the degree to which nursing home caregivers subconsciously adapt their behaviors in response to residents' depression states remains unclear. Further research exploring the automatic cognitive processes underlying such adaptations is, therefore, desirable. Such research could provide insights into optimizing caregiver-resident interactions and developing or adapting targeted interventions to support residents' moods.

Aim and objectives

The studies reported in this thesis aim to advance the understanding of mood-improving behaviors in nursing homes by 1) identifying behaviors exhibited by residents and caregivers that can contribute to mood improvement in residents, 2) developing and evaluating direct instruments for measuring mood-improving behaviors by residents and caregivers, as well as indirect instruments for measuring caregivers' implicit attitude (positive versus negative valence) and motivation (wanting versus not wanting) with these behaviors, and 3) examining the effect of priming caregivers with information about resident depression status on their implicit attitude and motivation regarding mood-improving behaviors. In addition to these primary aims, this thesis explores how changes in environmental stimuli during the COVID-19 pandemic may have influenced nursing home residents, providing insights to further inform strategies for improving resident mood in nursing homes.

To note, this thesis does not address whether residents' depression influences explicit mood-improving behaviors (as can be measured by direct instruments).

Outline and methodology

Part 1. Mood-improving behaviors and environmental stimuli in nursing homes

Chapter 2 presents a longitudinal observational study investigating the relationship between specific aspects of activities and depressive symptoms in nursing home residents in somatic care units (N = 40). While previous research has focused on activities as singular interventions, this study considers that an activity may consist of multiple components. For example, physical exercise in groups can be regarded as an activity that has at least two components, namely a physical component and a social component. This study explores the association between the degree to which residents participate in activities that can be regarded as having physical, creative, social, cognitive, and musical components on the one hand, and the extent of depressive symptoms in nursing home residents on the other.

Chapter 3 reports two studies that use the group concept mapping methodology (Kane & Trochim, 2007; Rosas, 2017) to systematically identify and organize informal strategies for improving residents' mood, focusing separately on strategies used by residents (Study 1) and relatives and caregivers (Study 2). These strategies, derived from input provided by residents, relatives, and professional caregivers (Study 1: N = 124; Study 2: N = 110), are evaluated for their expected effectiveness and feasibility.

Chapter 4 presents a cross-sectional study that uses an online survey to explore the perspectives of nursing home professional (N = 199) on how COVID-19-related changes in targeted and untargeted environmental stimuli may have influenced different types of challenging behavior – i.e., psychotic, anxious, agitated, apathic, and depressive behavior, the latter referred to as the presence of depressive symptoms (Zuidema et al., 2018) – among residents with different cognitive statuses (no dementia, mild dementia, advanced dementia). This study also investigates professionals' views regarding strategies for minimizing untargeted stimuli and adapting targeted stimuli to optimize the care environment for residents.

Part 2. Measuring mood-improving behaviors and caregivers' implicit associations with these behaviors

Chapter 5 describes the development and psychometric evaluation of two inventories designed to map informal mood-improving behaviors for nursing home residents: one focusing on behaviors that can be performed by residents themselves (Actions to Improve Mood by Residents; AIM-R) and the other on behaviors that may be carried out by professional caregivers (Actions to Improve Mood by Caregivers; AIM-C). Grounded in the findings of previous chapters, these inventories are intended to serve as practical tools for both research and daily practice. This chapter details the development process of the inventories, the assessment of their content validity (AIM-R: N = 31 residents; AIM-C: N = 35 caregivers), test-retest agreement (AIM-R: N = 206 residents; AIM-C: N = 125 caregivers), inter-rater agreement (AIM-C: N = 81 caregivers), and their practical application, as explored through semi-structured interviews (AIM-R: N = 12 residents and interviewers; AIM-C: N = 6 caregivers).

Chapter 6 details the development and psychometric evaluation of two IATs designed to measure caregivers' implicit attitude (Valence towards Behaviors to improve resident Mood IAT; VBM-IAT) and motivation (Motivation for Behaviors to improve resident mood IAT; MBM-IAT) regarding mood-improving behaviors for nursing home residents. The psychometric evaluation covers the content validity of selected target stimuli representing mood-improving behaviors (N = 35 caregivers), stimulus classification ease (N = 230), as well as the IATs' internal consistency (N = 230), test-retest reliability (N = 91), and convergent and discriminant validity (N = 111). Convergent

validity and divergent validity are evaluated against neighboring and non-neighboring constructs.

Part 3. Effects of priming caregivers with information about resident depression on their implicit associations regarding mood-improving behaviors

Chapter 7 reports on a study that uses the two IATs described in ***Chapter 6*** to examine whether priming nursing home caregivers with information about residents' depression influences caregiver implicit attitude and motivation concerning mood-improving behaviors for residents. The study uses a randomized within-subjects design with three time points, during which caregivers (N = 119, 85, 81) complete both IATs at each time point. Caregivers are primed with one of three textual vignettes, each representing a resident at a different depression level.

This thesis concludes with a general discussion in ***Chapter 8*** summarizing the key findings, reflecting on them in light of recent literature, addressing conceptual and methodological considerations, and discussing implications for practice, education, and future research.

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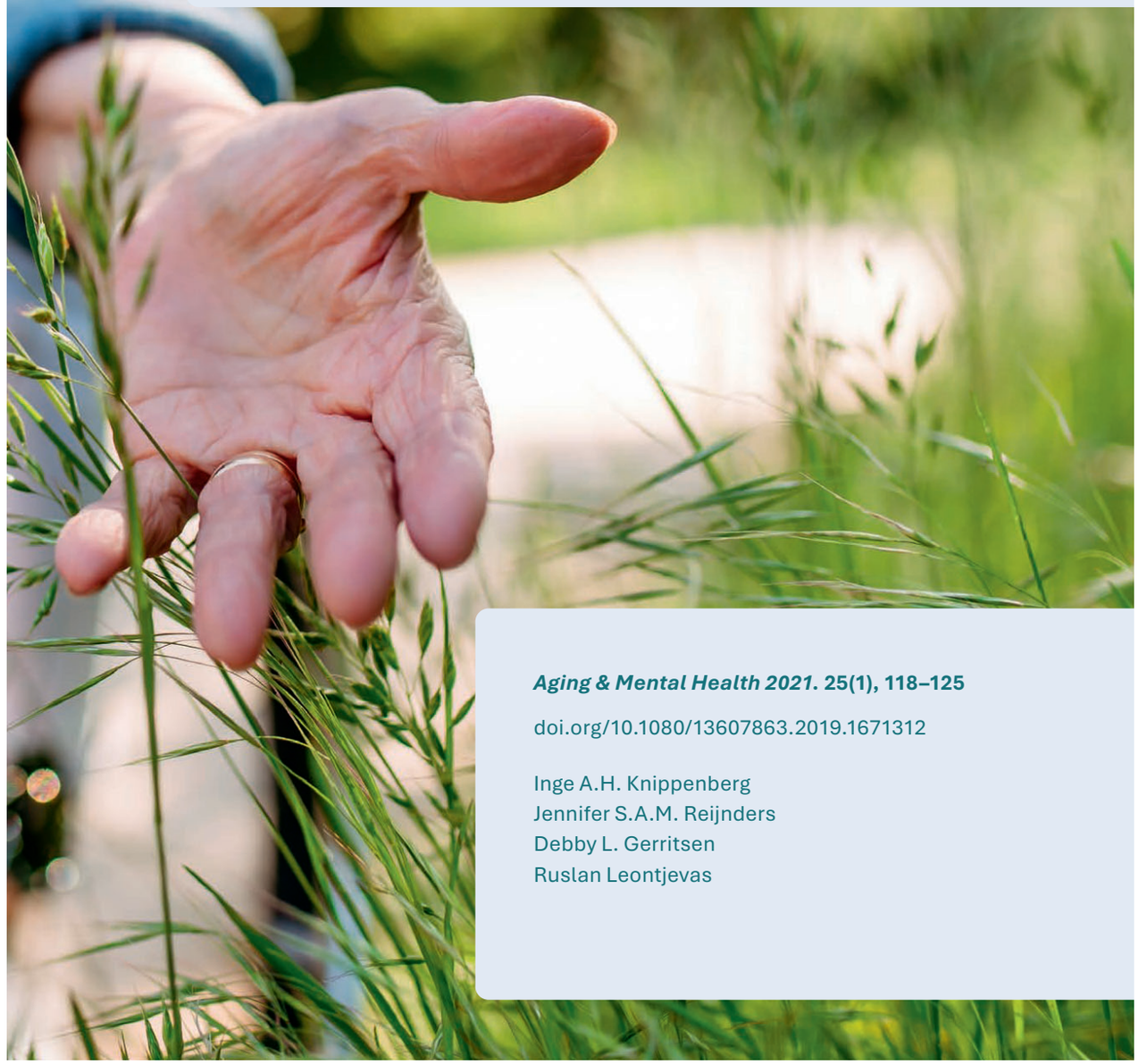
PART 1

Mood-improving behaviors and environmental stimuli in nursing homes

Chapter 2

The association between specific activity components and depression in nursing home residents: the importance of the social component



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Inge A.H. Knippenberg
Jennifer S.A.M. Reijnders
Debby L. Gerritsen
Ruslan Leontjevas

Abstract

Objectives: To longitudinally explore the association between activities and depressive symptoms of nursing home (NH) residents, taking into account that each activity may contain multiple components (physical, creative, social, cognitive, and musical).

Method: Study with a baseline and two follow-ups (four and eight months). Participants were forty physically frail residents of four NHs in the Netherlands. Residents were interviewed about depressive symptoms (CES-D) and activities they conducted over the previous week. Three researchers independently rank ordered each activity on the degree to which it could be regarded as having physical, creative, social, cognitive, and musical components. Accounting for the rank score and the time the resident spent on that activity, residents were categorized per activity component into four levels: absent, low, medium, and high.

Results: Mixed models predicting depressive symptoms from individual activity components showed significant associations for the social and cognitive components. Compared with the lowest activity level, the analyses showed fewer depressive symptoms for all higher levels of the social and cognitive components. However, a mixed model adjusted for all activity components showed no unique effect of the cognitive component or other components, while the effects of the social component remained significant. The analyses did not show differences between the time points.

Conclusion: The results suggest that the effects of activities on depressive symptoms might be mainly explained by their social component. It is, thus, important to always stimulate social involvement and interaction when developing and applying depression interventions. However, intervention research is needed to confirm these findings.

Introduction

Depression is common among residents of nursing homes (NHs) (Djernes, 2006; Jongenelis et al., 2004; Mozley et al., 2000; Seitz et al., 2010; Teresi et al., 2001) and contributes to a significant proportion of the disease burden and health care costs (Alexopoulos et al., 2002; Blazer, 2003; Katon et al., 2003; Unutzer et al., 2000). Understanding protective factors for depression in NH residents is necessary to develop tailored prevention and treatment strategies.

Many studies indicate that in older adults, participation in physical (e.g., physical exercise, walking), creative (e.g., arranging flowers, painting), social (e.g., visiting family or friends, group activities), and musical (e.g., listening to music, singing) activities contributes to improved quality of life, including decreased depressive symptoms (Cherry et al., 2013; Cohen et al., 2006; Greaves & Farbus, 2006; Hassmén et al., 2000; Holtfreter et al., 2017; Hong et al., 2009; Knapen et al., 2015; Ruuskanen & Ruoppila, 1995; Sarkamo et al., 2014; Seinfeld et al., 2013; Tavares et al., 2014; Vogel et al., 2009; Wassink-Vossen et al., 2014; Willemse et al., 2009; Yuen et al., 2011). Given current insights that a better state of well-being can be achieved if one is able to adapt to a challenging disease by making a dynamic balance between opportunities and limitations (de Vugt & Droes, 2017; Droes et al., 2017; Huber et al., 2011), participation in such activities may contribute to a person's social health as it may support their adaptation to age-related challenges such as physical illness and loss of close social contacts. Activities focused on cognitive stimulation such as reasoning or remembering (e.g., puzzles, memory groups; hereafter referred to as cognitive activities) might also be effective, although literature regarding their effects on different health outcomes such as mood and quality of life remains limited (Williams & Kemper, 2010).

For NH residents, the effects of participation in activities on mental health outcomes are less well-documented than for a general population of older adults. Due to frequently occurring chronic physical illness, cognitive decline, and loss of close social contacts, elderly people living in institutions seem particularly prone to having major depression and depressive symptoms (Llewellyn-Jones & Snowdon, 2007). Accordingly, prevalence rates of major depression and depressive symptoms are known to be higher within care facilities than in community-dwelling samples (Djernes, 2006; Jongenelis et al., 2004), which underlines the importance of research on potential protective factors in this specific population.

To date, the research on activities in older adults has tended to focus mainly on an activity as such without taking into account that an activity may address different aspects of individuals' experience or their life domains (Cherry et al., 2013; Cohen et al., 2006; Greaves & Farbus, 2006; Hassmén et al., 2000; Holtfreter et al., 2017;

Hong et al., 2009; Knapen et al., 2015; Ruuskanen & Ruoppila, 1995; Sarkamo et al., 2014; Seinfeld et al., 2013; Tavares et al., 2014; Vogel et al., 2009; Wassink-Vossen et al., 2014; Willemse et al., 2009; Yuen et al., 2011). For example, physical exercise in groups can be regarded as an activity that has at least two components, namely one that affects physical experience, and a social component that regards verbal or non-verbal communication with others. A better understanding of the effects of specific activity components on depressive symptoms is needed to develop tailored prevention and treatment interventions. Furthermore, due to the limited longitudinal and experimental research in this field, conclusions on a potential causal relationship between participation in activities and depressive symptoms are difficult to draw. To develop person-centered interventions, however, this knowledge is a prerequisite.

The aim of this study was, therefore, to contribute to the knowledge about the effects of different components of activities on depressive symptoms in NH residents. This study longitudinally explored the association between the degree to which an activity can be regarded as having physical, creative, social, cognitive, and musical components on the one hand, and the extent of depressive symptoms on the other hand, among NH residents.

Method

Study design

A longitudinal observational study with a baseline measurement (T0) and two follow-ups, at four months (T1), and eight months (T2) was conducted between January and December 2017.

Study population

The study population included adults aged 60 years and older living in Dutch NHs. Residents from NHs with ongoing or planned relocations, changes in care methods, or participation in other studies on similar topics were not invited to participate in the study. Only residents from NH units that provide medical-somatic care could participate, meaning that residents from units with predominantly psychogeriatric, palliative, and rehabilitation care were not included. Residents from these somatic care units (further somatic units) who, as indicated by the treating elderly care physician (Koopmans et al., 2013), were severely cognitively impaired, had a mental disorder, or a life expectancy of less than six months were also excluded. Based on an effect-size of 0.25, alpha of 0.05, and power of 0.80, a total sample size of 28 NH residents was needed (Erdfelder et al., 1996).

Ethics statement

The study has been reviewed by the research ethics committee (cETO) of the Open University (reference number: U2016/06589/FRO). The cETO judged the ethical aspects positively. The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) as well as the rules applicable in the Netherlands.

Procedure

NHs were recruited using convenience sampling through the University Network of Care Homes Nijmegen (UKON; a Dutch infrastructure for academic long-term care) (Koopmans et al., 2013; Leontjevas et al., 2013) as well as through networks of the researchers. After the NH management provided institutional informed consent, the treating elderly care physicians were asked to indicate which residents were eligible to participate in the study. Eligible residents received an information letter and were visited by one of the researchers who provided additional information verbally about the study's purpose and confidentiality issues. Written informed consent was obtained from all residents who were willing to participate in the study.

To collect all data, individual, structured face-to-face interviews were conducted with the residents at three time points (T0, T1, T2). Residents were asked to answer questions about socio-demographic factors (at T0 only), participation in activities, and depressive symptoms. The elderly care physicians provided information about use of antidepressant medication during the study.

Outcomes

Socio-demographic factors

A questionnaire assessing gender, age (years), marital status, and educational attainment was used. For educational attainment, educational levels were aggregated into three categories according to the International Standard Classification of Education (ISCED): low (levels 0 [Early childhood education] – 2 [Lower secondary education]), medium (levels 3 [Upper secondary education] – 4 [Post-secondary non-tertiary education]), and high (levels 5 [Short-cycle tertiary education] – 8 [Doctoral or equivalent level]) (UNESCO, 2012).

Depressive symptoms

A Dutch translation of the 20-item Center for Epidemiologic Studies Depression Scale (CES-D) was used to assess depressive symptoms. The CES-D is a self-reported questionnaire showing high internal consistency, acceptable test-retest reliability, and excellent concurrent validity with respect to clinical and self-report criteria (Radloff, 1977). The total score ranges from zero to 60 (with 0 [rarely or never] to 3

points [most or all of the time] for each item). A higher total score indicates more depressive symptoms. A cut-off score of 16 has typically been recommended to indicate depression (Weissman et al., 1977). For each measurement point in this study, the Cronbach's alpha of the CES-D was regarded as good (α = .92).

Activities

Residents were interviewed about their participation in activities over the previous week. For all activities, residents were asked to point out the group size, the number of days during the previous week that they participated, and the average time spent on the activity per day. Three researchers independently rank ordered each activity reported by the residents on the degree of physical (i.e., physical exertion), creative (i.e., creating something new), social (i.e., social interaction), cognitive (i.e., multiple mental abilities involving memory, attention, problem solving, orientation, planning, and decision-making), and musical (i.e., musical involvement) components using rank scores absent or very low, low, medium, high, very high. After combining the component rank scores of the three researchers, the scores were inspected by clustering the activities (like reading books, reading papers etc.) and by sorting activities per rank score. Discrepancies regarding equivalence (equivalent activities, e.g., reading a paper and reading a book, should have equivalent scores on specific components) and distinctiveness (e.g., a more physically intensive activity should have a higher score on the physical component than a less intensive activity) were solved based on consensus of three researchers by using intermediate rank scores. These intermediate rank scores indicate ordering within a cluster of comparable activities or when one or two researchers ordered the component to a higher rank score (e.g., one researcher scores Low and two researchers score Medium which resulted in a Low++ rank score, see **Table 1** for examples).

For each resident, the five activity component scores were calculated. For this, first, rank scores were rescaled on the range from 0 = absent/very low to 4 = very high, with 1/3 and 2/3 for the intermediate scores. These scores were multiplied by the number of days during the previous week that the resident participated in the activity and the average time spent on the activity per day. Subsequently, for each resident, five total component scores were available and categorized into four levels: absent (scores of 0), low (first 33.3% residents with scores higher than 0), medium (second 33.3% with scores higher than 0), and high (last 33.3% of residents with scores higher than 0).

Table 1. Examples of activities with their corresponding component rank scores (levels: A = absent or very low, L = low, M = medium, H = high).

Activities	Physical	Creative	Social	Cognitive	Musical
Reading in their own room (book, magazine, newspaper)	A	A	A	M	A
Discussing news or sports in a group	A	A	H+	M++	A
Exercise alone in their own room by a workout program on television	H++	A	A	L+	A+
Walking outside in a group (with or without using a rollator)	M++	A	M	A+	A
Handcrafts alone in their own room (knitting, embroidering)	A++	M+	A	L+	A
Painting alone in their own room	A+	H++	A	M	A
Painting in a group	A+	H++	L++	M	A
Memory exercises in a group	A	A+	H	H++	A
Memory exercises alone in their own room by a program on television	A	A+	A	H++	A
Listening to music alone in their own room	A	A	A	A+	M+
Playing the keyboard alone in their own room	A++	M+	A	M++	H++

Note. '+' and '++' reflect intermediate rank scores that were added when the activity was ranked to a higher rank by one or two researchers, or when discrepancies regarding equivalence or distinctiveness were solved by re-ordering the activities on the component.

Use of antidepressant medication

The use of antidepressant medication was scored dichotomously (0: no antidepressant use, 1: use of one or more antidepressants).

Statistical analysis

Statistical analyses were conducted using IBM SPSS version 22.0 (IBM Corporation, 2013). To prevent type 2 errors, missing values concerning antidepressant use (10 out of 104 records) were imputed to zero (no antidepressant use). The depressive symptom scores were centered and standardized using the SD and the mean score at baseline.

We compared mixed models with fixed effects for time points (T1 and T2 compared with T0) with models without time points using likelihood ratio tests. The model with the best fit was used for estimating the effects. A p-value of .05 was used. However, it is argued that statistical significance examines whether the findings are likely to be due to chance, whereas effect-size is important to understand the magnitude of differences found (Sullivan & Feinn, 2012). Therefore, we also reflected on the size of estimated effects, representing the number of standard deviations of depressive

symptoms that a component level differed from the lowest component level (i.e., *absent* for all components but cognitive component with the reference *low level*). Given that the depressive symptoms were standardized, we used Cohen's d criteria to describe the effect-size: the effect of 0.2 and higher was regarded as small, 0.5 and higher as medium, and 0.8 and higher as large (Cohen, 1988). An effect of 0.2 and larger was regarded as clinically relevant (Kazdin & Bass, 1989).

Mixed models accounting for repeated measurements with unstructured covariance matrix and corrected for antidepressant use were built for activity components (lowest component activity level as reference category) predicting depressive symptoms. A fixed and a random intercept were specified. Several models were built for activity components: one model for each component without adjustments for other activity components, and one model with all components corrected for each other.

Results

Residents from 12 somatic units in four NHs located in two Dutch provinces were recruited for the study. In these NHs, 93 residents (of whom 57 female [61.3 %]) met the inclusion criteria and were invited to participate in the study. Of these, 40 (43%) provided informed consent (of whom 26 female [65%]; mean age 79.8 years [SD, 8.9]). All 40 participants completed T0, 33 participants (82.5%) completed T1, and 31 participants (77.5%) completed all three measurements. Reasons for those who did not complete all three measurements were death (N = 4), withdrawal (N = 3), or relocation (N = 2).

Table 2 presents socio-demographical data and relevant outcomes at T0, T1, and T2. Most participants were widowed (N = 26 [65%]), had a low level of educational attainment (N = 25 [62.5%]), and did not use antidepressant at baseline (N = 25 [62.5%]). In total, 20 participants (50%) had a depression score of ≥ 16 at baseline (range from 1 to 46). No significant change over time in depressive symptoms and antidepressants use was found ($p > .05$). **Table 3** shows the number of NH residents categorized per activity component in four levels.

Comparison of models with fixed effects for time points (T1 and T2 compared with T0) with models without time points revealed that the latter was the better fitting model. Therefore, the models for the effects of activities did not include the three time points.

Table 2. Socio-demographic factors, depressive symptoms, and antidepressant use.

	T0 (N = 40)	T1 (N = 33)	T2 (N = 31)
Age, mean (SD), [range]	79.8 (8.9), [60-96]	80.1 (9.4), [60-96]	79.5 (9.4), [60-96]
Sex, female, N (%)/male, N	26 (65)/14	23 (69.7)/10	21 (67.7)/10
Marital status			
Unmarried, N (%)	2 (5)	2 (6.1)	2 (6.5)
Married or partnered in a registered partnership, N (%)	8 (20)	6 (18.2)	6 (19.4)
Widowed (after marriage or registered partnership), N (%)	26 (65)	21 (63.6)	19 (61.3)
Divorced (after marriage or registered partnership), N (%)	4 (10)	4 (12.1)	4 (12.9)
Educational attainment			
Low, N (%)	25 (62.5)	20 (60.6)	19 (61.3)
Medium, N (%)	14 (35)	12 (36.4)	11 (35.5)
High, N (%)	1 (2.5)	1 (3)	1 (3.2)
Depressive symptoms, mean (SD), [range]	19.6 (13.4), [1-46]	18.9 (13.3), [1-50]	19.6 (13.1), [2-51]
Antidepressant use, yes, N (%)/no, N[a]	15 (37.5)/25	12 (36.4)/21	10 (32.3)/21

Note. [a]Missing values ($N_{T0} = 5$, $N_{T1} = 3$, $N_{T2} = 2$) were replaced by antidepressant use is 'no'.

Table 3. Number of nursing home residents per activity component level, N (%).

	T0 (N = 40)	T1 (N = 33)	T2 (N = 31)
Physical			
Absent	16 (40)	11 (33.3)	11 (35.5)
Low	8 (20)	7 (21.2)	6 (19.4)
Medium	8 (20)	5 (15.2)	9 (29.0)
High	8 (20)	10 (30.3)	5 (16.1)
Creative			
Absent	18 (45)	16 (48.5)	13 (41.9)
Low	7 (17.5)	8 (24.2)	9 (29)
Medium	7 (17.5)	4 (12.1)	5 (16.1)
High	8 (20)	5 (15.2)	4 (12.9)
Social			
Absent	4 (10)	3 (9.1)	6 (19.4)
Low	12 (30)	7 (21.2)	6 (19.4)

Table 3. Continued

	T0 (N = 40)	T1 (N = 33)	T2 (N = 31)
Medium	12 (30)	7 (21.2)	7 (22.6)
High	12 (30)	16 (48.5)	12 (38.7)
Cognitive			
Absent	0 (0)	0 (0)	0 (0)
Low	13 (32.5)	14 (42.4)	16 (51.6)
Medium	13 (32.5)	6 (18.2)	6 (19.4)
High	14 (35)	13 (39.4)	9 (29)
Musical			
Absent	23 (57.5)	18 (54.5)	17 (54.8)
Low	5 (12.5)	8 (24.2)	6 (19.4)
Medium	6 (15)	1 (3)	4 (12.9)
High	6 (15)	6 (18.2)	4 (12.9)

Note. Total component scores (a component score for the activity x number of days during the previous week that the participant participated in the activity x average time spent on the activity per day) were categorized using cut-off scores determined at baseline into levels: absent (scores of 0), low (first 33.3% of scores higher than 0), medium (second 33.3% of scores higher than 0), and high (last 33.3% of scores higher than 0).

Table 4 presents the effects of activities predicting depressive symptoms. The social ($F(3, 57.73) = 7.92$, $p = .000$) and cognitive components ($F(2, 62.21) = 4.23$, $p = .019$) were associated with depressive symptoms in individual models corrected only for antidepressant use but not for other activity components. Compared with the lowest component activity level, the analyses showed fewer depressive symptoms for all higher levels of the social and cognitive components. The physical ($F(3, 53.61) = 2.73$, $p = .053$) and creative components ($F(3, 52.44) = 2.52$, $p = .068$) appeared to be marginally significant in individual models showing clinically relevant effect-sizes.

Table 4. Mixed models of activity components predicting depressive symptoms.

Parameter	Physical component	Creative component	Social component	Cognitive component	Musical component	All activity components
AD, yes[a]	0.02 (0.22)	-0.06 (0.21)	0.05 (0.19)	-0.15 (0.21)	-0.10 (0.22)	0.07 (0.21)
Activity components						
Physical[b]	F (3, 53.61) = 2.73, p = .053					F (3, 54.55) = 0.29, p = .831
Low	-0.23 (0.13)					0.13 (0.19)
Medium	-0.23 (0.17)					0.15 (0.21)
High	**-0.47 (0.17)**					-0.00 (0.23)
Creative[b]		F (3, 52.44) = 2.52, p = .068				F (3, 51.11) = 1.16, p = .336
Low		-0.19 (0.14)				-0.25 (0.18)
Medium		**-0.44 (0.17)**				-0.42 (0.23)
High		-0.35 (0.21)				-0.17 (0.26)
Social[b]			**F (3, 57.73) = 7.92, p < .001**			**F (3, 54.96) = 4.73, p = .005**
Low			**-0.39 (0.20)**			-0.36 (0.25)
Medium			**-0.82 (0.21)**			**-0.78 (0.27)**
High			**-0.82 (0.20)**			**-0.75 (0.27)**
Cognitive[c]				**F (2, 62.21) = 4.23, p = .019**		F (2, 65.52) = 1.02, p = .368
Medium				**-0.37 (0.15)**		-0.21 (0.16)
High				**-0.40 (0.15)**		-0.23 (0.19)
Musical[b]					F (3, 52.72) = 0.94, p = .426	F (3, 58.09) = 0.17, p = .917
Low					-0.16 (0.14)	-0.07 (0.16)
Medium					-0.12 (0.20)	-0.07 (0.20)
High					-0.32 (0.21)	-0.15 (0.23)

Note. Six models were built for activity components: [five individual models] for each component without adjustments for other activity components, and one model with all components corrected for each other. All models are adjusted for antidepressant use. The depressive symptom scores were centered and standardized using the standard deviation and the mean score at baseline. Standard errors are in parentheses. AD = Antidepressant use. $p < .05$ are in boldface.
[a]AD was dummy coded, with 'no' as reference category.
[b]Physical, creative, social, and musical activity components were ordinal variables with 4 categories (absent, low, medium, and high), with 'absent' as reference category.
[c]The cognitive activity component was an ordinal variable with 3 categories (low, medium, and high), with 'low' as reference category.

In the combined model with all components as predictors, a significant association of depressive symptoms with the social component ($F(3, 54.96) = 4.73$, $p = .005$) was found, but not with other activity components.

In terms of effect-sizes, the medium effect-sizes with clinical relevance in individual models for physical, and musical activities dropped below the threshold of clinical relevance in the combined model with all components. Although not significant, almost all reduced effect-sizes for creative and cognitive activities can still be considered as clinically relevant in the combined model. The effect-sizes for the social component can be considered as clinically relevant ranging from medium to large effects (e.g., estimated effect for the highest level compared to absent, -0.75 [95% Confidence interval, -1.29 to -0.21], $p = .007$, model corrected for other activity components).

Discussion

A longitudinal observational study of NH residents was conducted to explore the association between depressive symptoms and five components of undertaken activities: physical, creative, social, cognitive, and musical. The analyses showed that participating in activities with social components is associated with fewer depressive symptoms, regardless of whether or not other components were present. To note, the effect-sizes ranged from 'medium' to 'high' and can be interpreted as clinically relevant (Kazdin & Bass, 1989). The findings regarding this association are consistent with previous studies among older people (Greaves & Farbus, 2006; Holtfreter et al., 2017; Hong et al., 2009). From a theoretical perspective, there might be several reasons for the effect of the social component of activities. For instance, social identity theory proposes that a person's sense of who they are depends on the groups to who they belong (Tajfel, 1979). It is argued that social identification is the mechanism through which social relationships affect depression (Cruwys et al., 2014). In our study, it is possible that participants who join group sessions, identify themselves with this group, and subsequently, influence one's sense of belonging which is needed for health maintenance and well-being. Furthermore, self-determination theory (SDT), a theory of human motivation and personality that addresses three universal, innate and psychological needs (competence, autonomy, and psychological relatedness) might explain the mechanism through which the social component of activities affects depression (Ryan & Deci, 2000). SDT has been identified as a way to understand motivations and behavior change in older adults, particularly as it relates to aging and leisure (Altintas et al., 2018; Lin & Yen, 2018). Regarding our study, participating in activities with social components may contribute to fulfillment of psychological relatedness (and possibly other needs as well), and subsequently, a decrease in depressive symptoms. Also, in accordance with the concept of social health (de Vugt & Droes, 2017; Droes et al., 2017; Huber et al., 2011), participation in such activities may entail adapting to age-related challenges.

Furthermore, the analyses revealed that the cognitive component of activities is associated with fewer depressive symptoms. However, the association disappeared when we corrected for the presence of other components. The effect-sizes of both the individual model and the model corrected for other activity components, can be classified as 'medium'. This suggests that the effects are in line with other studies that find effects of cognitive activities and do not account for other activity components including social interaction or involvement. For example, a 'memory exercises in a group' may be effective because of the social interaction involved, not due to the cognitive aspects.

Although clinically relevant effect-sizes were found for most levels of the physical and creative components in models without corrections for other components, nearly all effect-sizes decreased to below the threshold of 0.2 for clinical relevance when the model was adjusted for other components. Again, this may suggest that the effects of physical and creative components can be – at least partially – explained by other components. For example, an 'exercise intervention' might not or not solely be effective due to body movements as such but due – for a substantial part – to social interaction with other people during the exercises.

The analyses did not show statistically significant effects for the musical components of activities. Furthermore, the analyses suggested that if clinically relevant effects for such activities were statistically significant (e.g., in a study with a larger sample), these effects might also be explained by other components in these activities (e.g., social). It is possible that effects for musical activities in other studies may–at least partially–be attributed to a social component. For example, a musical intervention with patients making music within a group may be effective because of the social interaction involved, not the music itself. However, intervention research is needed to confirm these findings. Exploring and comparing the (combined) effects of specific components in experimental research that varies the components within an activity (such as more social versus less social involvement during a physical activity) might thus be advised.

Analyses implied a lack of temporary changes in depressive symptoms (i.e., no differences were found between the baseline and the two follow-ups). It is unclear whether there may be temporary changes when there is a longer follow-up period. It is possible that a low level of depressive symptoms makes residents more inclined to participate in activities, or that a low level of depressive symptoms is being maintained by participating in activities. Future research is needed to explore the causalities.

This study assessed the effectiveness of activities rather than efficacy, as it focused on activities performed by residents on their own initiative, while participants in experimental studies are randomized between an intervention condition and a

control condition. For example, in the study by Sarkamo et al. (2014), participants were randomized into a singing group, a music listening group, and a usual care group. Different findings between the current observational study and randomized controlled trials (RCT) might, therefore, be explained by the differences between those who already participate in activities and those who do not participate in activities but are stimulated to participate in an RCT. For example, some residents may be physically inactive, and a new intervention can be effective while self-chosen physical activities (as in our observational study) can be ineffective. Furthermore, different findings between this study and other studies among older adults might be explained by the intensity of the activities. The intensity of activities among NH residents may be lower than those among community-living elderly people due to physical conditions or because of the intensity or number of activities offered within the NHs.

Strengths and limitations

The present study has gone some way towards enhancing our understanding of the association of specific components of activities with depressive symptoms in NH residents since we were able to take into account that a specific activity can contain multiple components (i.e., physical, creative, social, cognitive, and musical). Another strength of the current study is that residents were followed for eight months, giving the study more power.

In order to limit missing data in self-reports, we conducted face-to-face interviews, which is common practice in research among NH residents (Leontjevas et al., 2013). To reduce social desirability bias, we used structured interviews and a validated measurement instrument with forced-choice items for depressive symptoms (Nederhof, 1985). We used open-ended questions to measure participation in activities because we considered it important to allow residents to mention all of the activities that were meaningful to them.

Another strength of this study is that, by using face-to-face interviews, we were able to account for observed differences in personality (e.g., extraversion vs. introversion). For example, some residents indicated that they had not participated in activities during the past week. Nevertheless, after prompting them with examples, they reported several activities. It was also noted that, while some participants were eager to communicate all activities in which they had participated, others initially seemed reluctant to share this information. Questions about participation in activities were repeatedly asked until the participant indicated that he or she did not participate in further activities. By applying this method with all participants, we minimized the possible effect of differences in openness.

This study had several limitations. First, the sample size was not large enough to correct for the hierarchical structure of the data regarding NHs, since a small sample size at NH level (≤ 50) may lead to biased estimates of the second-level standard errors (Maas & Hox, 2005). A recommendation for future research would, therefore, be to recruit more residents and more NHs to account for the clustered structure of the data.

Another limitation of this study lies in the determination of the five component scores for each activity reported by the residents. Since no validated measuring instrument was available, determining these scores was done in a pragmatic manner by three researchers. However, since the researchers were blind to each other's rank scores, and reached consensus for discrepancies regarding equivalence and distinctiveness, we were able to reduce the degree of subjectivity. Nevertheless, it should be noted that the component scores were not based on participant observation, neither on self-reports of the residents. Although some activities were performed in a group, we could not determine whether participants were actually engaged in social interactions. It is possible that self-reports could result in more pronounced effects because reports of others show a tendency to attenuate self-reports (Leontjevas et al., 2016). Therefore, self-reported scores or observations need to be explored in future research. Furthermore, in our study, we could not examine which specific aspects of social components contribute to fewer depressive symptoms. For example, older people with dementia living in care homes state that they particularly found meaning in activities that address psychological and social needs, which related to the quality of the experience of an activity rather than specific types of activities (Harmer & Orrell, 2008). Therefore, future research could explore specific aspects of social components including meaningfulness and sense of belonging related to depression.

In addition, since it may be expected that residents with a more active lifestyle were more attracted to the study and consequently more inclined to participate in the study, residents with a more active lifestyle may have been overrepresented in the sample. Also, as assessed by the CES-D (cut-off score of 16) half of the participants in our study probably suffered from depression. Djernes (2006) notes that the prevalence of major depression ranges from 14% to 42% among elderly people living in nursing homes. Although CES-D is not a diagnostic instrument, it is possible that our sample had slightly more residents with depression than could be expected. Furthermore, since we used a convenience sample from Dutch NHs, it is important to be cautious when generalizing the results of this study.

Some residents indicated spontaneously that there were too few opportunities to participate in activities within their NH unit. Because no information was collected about determinants of participation, we could not test specific barriers to nor reveal facilitators of participating in activities. Some barriers and facilitators for engagement

in activities may also have influenced our results and could be included as potential confounders in future research.

Conclusions and implications

The results of this study suggest that the effects of activities on depressive symptoms might be mainly explained by their social component. For the purpose of depression prevention and treatment, it can thus be advisable to develop and apply interventions that specifically include social interaction and contribute to improvements of a person's social health. For example, group sessions aimed at flower arranging or painting could be preferred over individual sessions. It is important to realize that each activity residents can be engaged in has multiple aspects. The current study contributes to better insight into the effects of activity-based interventions by showing different effects of specific activity components. Intervention research is needed to understand whether effects of activity-based interventions in NH residents can be explained by their social aspects, and how the effects of specific activities can be enhanced for the purpose of depression prevention and treatment.

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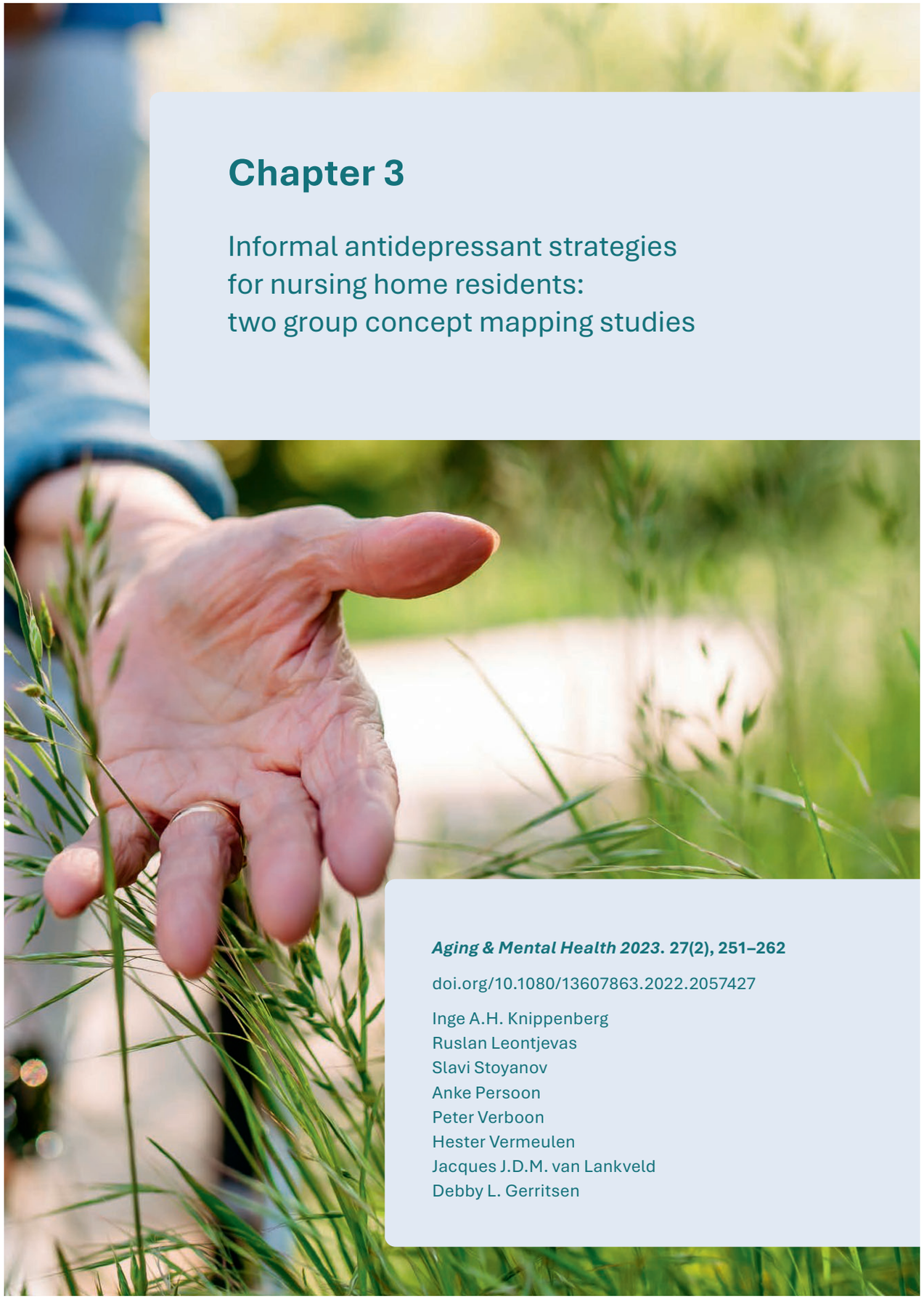

Chapter 3

Informal antidepressant strategies for nursing home residents: two group concept mapping studies

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Inge A.H. Knippenberg
Ruslan Leontjevas
Slavi Stoyanov
Anke Persoon
Peter Verboon
Hester Vermeulen
Jacques J.D.M. van Lankveld
Debby L. Gerritsen

Abstract

Objectives: To identify and structure potential informal antidepressant strategies that can be used in daily practice for nursing home residents alongside formal treatments.

Methods: In a first Group Concept Mapping study, residents, relatives, and professional caregivers (N = 124) brainstormed on strategies residents could use to prevent or alleviate depression. In a second study, the same participants (N = 110) reported strategies for use by others. Furthermore, participants rated the expected effectiveness and feasibility of the suggested strategies. Simultaneously, all strategies were sorted by experts and clustered using multidimensional scaling and hierarchical cluster analysis.

Results: Six clusters emerged for strategies by residents themselves and five clusters for strategies by others. For residents' strategies, the clusters *Being socially connected* and *Participating in activities* were perceived as most effective, as was the cluster *Offering personal attention* for strategies by others. Participants perceived *Creating a healthy living environment* as the most feasible cluster executed by residents. Within strategies by others, the clusters *Offering personal attention*, *Using positive treatment / approach*, and *Using or adapting the physical environment* were perceived as the most feasible.

Conclusion: The results indicated the importance of social connectedness, a personalized and positive approach by significant others, and tailored activity programs. The results also suggest that adaptations to the physical environment within nursing homes may be an easy applicable strategy to prevent or alleviate depression in residents. Although more research is needed, these findings may guide daily practice and the development of interventions that include informal strategies.

Introduction

Depressive disorders and depressive symptoms (further referred to as depression) are common in nursing home (NH) residents worldwide (Assariparambil et al., 2020; Nazemi et al., 2013; Seitz et al., 2010; Tiong et al., 2013) and affect nearly half of all residents with dementia and almost one quarter of those without dementia (Van Asch et al., 2013). Depression in older people is associated with various negative outcomes including increased mortality (Barca et al., 2009; Kane et al., 2010), low quality of life (Henskens et al., 2019; Sivertsen et al., 2015), and increased risk of hospitalization and utilization of other health care services (Bartels et al., 2003; Luo et al., 2015; Smalbrugge et al., 2006). Research suggests that, in addition to formal treatments such as antidepressant medication and psychotherapy, informal antidepressant strategies may be helpful in NHs (Meeks & Looney, 2011). For example, caregivers may seat a resident with depression at a table near the window because they have noticed earlier that sitting near the window improved the resident's mood. Sitting near the window may have antidepressant effects due to extra daylight or pleasant views from the window (Aries et al., 2015; Beute & de Kort, 2014). To further improve depression care, it is important to learn from informal antidepressant strategies already being used successfully in daily practice, alongside or instead of formal treatment (Leontjevas et al., 2013; Meeks & Looney, 2011).

Previous studies suggest that informal strategies that can mitigate depression may be applied by residents, their relatives, and professional caregivers in daily practice. For example, several studies reveal self-management coping strategies in residents, including taking a walk, having a positive attitude, and seeking company (Choi et al., 2008; Tsai, 2006). Other studies suggest that participating in pleasant activities—in particular, activities that include social involvement and interaction (Beerens et al., 2018; Cohen-Mansfield, 2018; Knippenberg et al., 2021; Owen et al., 2021), activities that are meaningful (Harmer & Orrell, 2008; Owen et al., 2021; van Corven et al., 2021), and activities that are informal and tailored to the individual (Mbakile-Mahlanza et al., 2020; Meeks & Looney, 2011; Meeks et al., 2007)—may reduce or have a protective effect against depression in residents. The importance of a personalized and stimulating approach of caregivers, and an interpersonal and reciprocal relationship between the resident and caregiver was recognized as well (Cheng et al., 2010; Gilmore-Bykovskyi et al., 2015; Meeks & Looney, 2011; Nakrem et al., 2011; Vernooij-Dassen et al., 2011). Moreover, another study indicated that quality of life of residents improved after depression assessment procedures were conducted by staff, even without subsequent formal treatment (Leontjevas et al., 2013), which may suggest that residents themselves, or others important in residents' lives, may apply informal antidepressant strategies. Although gaining insight into these strategies is important in learning how to improve depression care, to the best of our knowledge, exploration of such strategies has not been performed systematically.

The aim of this study was, hence, to systematically identify and structure potential informal antidepressant strategies for NH residents that can be used in daily practice by residents themselves or significant others, from the perspective of residents, their relatives, and professional caregivers. Furthermore, this study aimed to categorize key elements of informal antidepressant strategies and to describe their expected effectiveness and feasibility. Revealing and prioritizing these strategies by using a bottom-up approach allows innovations to be discovered and interventions to be developed in addition to using theory-driven approaches.

Material and methods

Transparency and openness

This article follows the APA Style Journal Article Reporting Standards (APA Style JARS) (Levitt et al., 2018). Research materials, anonymized data, and analysis code are available from the corresponding author upon request. Data were analyzed using the Global MAX™ software (2019) and SPSS 25 (IBM Corporation., 2017).

Ethics statement

Ethical clearance was obtained from the Medical Ethics Review Committee of the Arnhem-Nijmegen region (CMO Radboudumc, reference number: 2019-5464). The study was conducted in accordance with the Declaration of Helsinki as well as the rules applicable in the Netherlands. Only participants who provided informed consent (by using a paper document or online form) were included.

Group Concept Mapping

Group Concept Mapping (GCM) was used to identify and structure informal antidepressant strategies for NH residents. GCM is a participatory multiphase mixed-methods approach consisting of brainstorming, idea synthesis, idea structuring (sorting and rating), and analysis and interpretation (Kane & Trochim, 2007; Rosas, 2017). A major advantage of GCM is that it is particularly useful for detailed idea generation by a diverse research population and for structuring and representing the content of complex concepts by integrating qualitative group processes with multivariate statistical analysis (Kane & Rosas, 2017). GCM applies user-friendly methods familiar to most people for data collection (e.g., expressing opinions in their own words and rating ideas according to particular dimensions, e.g., regarding expected effectiveness and feasibility). Moreover, GCM enables researchers to objectively reveal potential barriers and facilitators of the proposed strategies (Kane & Rosas, 2017). In the present research, two GCM studies were conducted simultaneously to examine strategies

that can be used by 1) NH residents themselves (Study 1) and 2) significant others, i.e., those in the residents' (social) environment (Study 2).

Participants

For both GCM studies, NH residents, relatives, and professional caregivers were invited to participate. Participants were recruited from five NHs associated with the University Network of Care Homes Nijmegen (UKON, a Dutch infrastructure for academic long-term care) (Koopmans et al., 2013) and through professional networks of the researchers.

Eligibility criteria for residents were as follows: 1) stay in a NH unit that provides medical-somatic care, psychogeriatric care, or mental-physical multimorbidity care and 2) ability to provide informed consent. Residents with a life expectancy of less than six months or a severe mental or cognitive condition that might have a major impact on their participation in the study were excluded. Relatives could participate in the study if 1) they were aged 18 years or older and 2) the associated NH resident resided in a NH unit providing medical-somatic care, psychogeriatric care, or mental-physical multimorbidity care. All types of professional caregivers (e.g., nurses, physicians, psychologists, spiritual counselors, musical therapists) aged 18 years or older and employed at one or more of the aforementioned NH care units were eligible to participate in the study. A relationship between members of these participant groups was allowed but not required (e.g., an eligible family member could participate in the study, irrespective of whether the related resident participated in one of the studies).

Procedure and materials

A professional caregiver (registered nurse, psychologist, or elderly care physician; Koopmans et al., 2010) determined whether residents, relatives, and professional caregivers were eligible for the study. All eligible participants were approached by one of the researchers. Residents received an information letter and were subsequently visited by one of the researchers who verbally provided additional information about the study's purpose and confidentiality issues. Relatives and professional caregivers received the information letter by post or e-mail and could contact the researcher for questions by phone or e-mail. After eligible participants provided their informed consent and socio-demographic characteristics, they could participate.

To collect the data, one of the researchers conducted individual face-to-face structured interviews with residents. A professional caregiver provided information about residents' depression. Relatives and professional caregivers were given the opportunity to participate face-to-face or online. For the GCM's brainstorm phase, they could also choose to participate individually or in a group.

Data were collected using LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) and the Concept Systems Global MAX™ software (2019), either by one of the researchers who entered the data obtained from subjects who participated face-to-face, or by participants themselves (if they participated online). Data were collected between October 2019 and February 2021.

GCM phases

Brainstorming. (October 2019 to February 2020). In a first round of both studies, participants were asked to generate specific statements by completing an incomplete sentence (a 'focus prompt') from their own perspective as often as they wanted. The focus prompts of both GCM studies are presented in **Table 1**. These prompts were developed by the authors of the manuscript, who discussed them until consensus was reached. Before the research was conducted, the prompts were pretested with five participants (professional caregivers), focusing on clarity.

Table 1. Focus prompts used in the two GCM studies.

	Nursing home residents	Relatives and professional caregivers
Strategies that can be used by residents themselves (Study 1)	'My mood can improve if I… [informal action].'	'The mood of a nursing home resident can improve if he/she… [informal action].'
Strategies that can be used by significant others (Study 2)	'My mood can improve if relatives or professional caregivers…[informal action].'	'The mood of a nursing home residents can improve if relatives or professional caregivers…[informal action]'.

Idea synthesis. (March to April 2020). To obtain a representative and practicable (in terms of sorting and rating) list of unique, relevant, and unambiguously formulated statements, the process proceeded with the researchers reducing and editing the generated set of statements of both studies. Researchers aimed to limit the final set of statements to 100 or fewer as recommended (Kane & Trochim, 2007). Using the guidelines outlined by Kane and Trochim (2007), statements containing multiple ideas were split into two or more distinct statements by a researcher. The researcher than coded all statements and subsequently allocated the statements to themes and underlying categories to better identify duplicates. All statements were, then, coded and subsequently allocated to themes and underlying categories to better identify duplicates. Afterward, the emerging codes were carefully checked for duplicates (wording) and level of detail by two researchers. While codes that were too specific were aggregated to a code with a higher level of abstraction (e.g., 'looking at personal photos' and 'recording the course of life' were aggregated to 'retrieving precious memories'), duplicate codes and codes that were represented by other specific codes were removed, as well as those that were too broadly formulated (e.g., 'to activate').

To establish a consistent set of statements in accordance with the brainstorming prompt, we edited the codes if needed (e.g., we chose to use the word 'resident' in all statements instead of 'patient' or 'client'). Finally, the original statements were checked by two other researchers and subsequently discussed to reach consensus, resulting in a final set of statements for each study.

Idea structuring. (July to November 2020). In a second round for both studies, the final set of statements was rated by participants from the brainstorming phase using 5-point scales for expected effectiveness (1 = *not at all or very limited effectiveness*, 5 = *very effective*) and feasibility (1 = *[almost] never feasible*, 5 = *[almost] always feasible*). Meanwhile, 13 experts with backgrounds in psychology, nursing sciences, health sciences, or human movement sciences, and with expertise in research and clinical practice regarding older persons, NH care, depression, dementia, or health promotion, sorted the statements into groups based on content similarity.

Analysis and interpretation. (December 2020 to February 2021). Using multidimensional scaling and hierarchical cluster analysis, several cluster maps were produced based on the sorted statements using the Global MAX™ software (2019). First, we examined the stress values for both studies. A high stress level indicates considerable variability in the way experts sorted the statements, which may imply that the overarching construct (i.e., informal antidepressant strategies) is complex (Kane & Trochim, 2007). On the other hand, a low stress value indicates that participants sorted the statements in a similar way, suggesting that the construct is more simply structured and generally agreed upon (Kane & Trochim, 2007). Kane and Trochim (2007) reported that approximately 95% of the concept mapping studies yield stress values that range between 0.205 and 0.365 (M = 0.285, SD = .04). A meta-analytic study of 69 GCM studies confirmed that 96% of the sample had a stress value that fell within this range (Rosas & Kane, 2012). Based on a simulation study with 100 statements scaled in two dimensions, there is a 1% chance that stress values below 0.39 reflect maps with statements that are randomly sorted or without structure (Sturrock & Rocha, 2000). Therefore, in this study, we interpreted the stress values against the upper limit of 0.39.

Second, we explored whether a similarity cut-off value should be used that reflects the number of sorters who paired two statements together (Concept Systems Incorporated, 2017). Using a similarity cut-off value of 1 for Study 2 resulted in maps that could be interpreted more easily as compared to the default (no similarity cut-off). Therefore, a cut-off value of 1 was applied for Study 2, meaning that statements that were paired together by only one sorter were not regarded as being paired at all (i.e., values in the similarity matrix at or below the cut-off value are set to 0 (Concept Systems Incorporated, 2017)).

Third, based on hierarchical cluster analysis, different solutions for clustering the statements (ranging between four and eight clusters for each study) were discussed using two interpretation workshops. In these workshops, experts (N = 7) and health care professionals (N = 9) discussed these solutions by taking into account the content, and bridging values of the statements and clusters. Bridging scores can range between 0 and 1. Lower bridging scores imply stronger agreement on the clustering of the statements, while higher bridging scores indicate that statements were grouped together less often by participants in the sorting phase. Before the workshops, experts and professional caregivers were asked to select the most suitable number of clusters (i.e., the number of clusters that best represents the separate main themes within informal strategies) and to assign a descriptive label to each cluster. During the workshops, participants discussed these topics until consensus was reached.

Finally, for the two cluster maps that were deemed to best represent the main themes (one map for each study), rating data were analyzed and visualized in cluster rating maps (visual representation of cluster ratings on the cluster map) and relative pattern matches (bivariate comparison of cluster ratings) that depict average cluster ratings for effectiveness and feasibility using the Global MAX™ software (2019). Findings were discussed and validated in two interpretation workshops with experts (N = 4 and N = 3) and two interpretation workshops with health care professionals (N = 9 and N = 6).

Results

For both studies, socio-demographic factors of the participants are provided in **Tables 2—4**. In total, 124 participants (38 residents [Mean age years, 81.1; SD, 10.4] 25 relatives [59.7, 14.2], and 61 professional caregivers [43.0, 13.5]) participated in the brainstorm phase of the first study (Study 1). In the second study (Study 2), the total number of participants for the brainstorm phase was 110 (38 residents [Mean age years, 81.1; SD, 10.4], 22 relatives [58.7, 14.3], and 50 professional caregivers [43.2, 14.0]). For both studies, five face-to-face group brainstorm meetings were held, one with relatives (N = 6) and four with professional caregivers (total N = 35, range = 4 - 13 participants per session). The remainder of the participants participated individually.

Of the 124 participants in the brainstorm phase of Study 1, 46 participants (6 residents, 21 relatives, and 19 professional caregivers) individually rated the statements for expected effectiveness, while 42 participants (6 residents, 17 relatives, and 19 professional caregivers) rated them for expected feasibility. Eight new participants (3 relatives and 5 professional caregivers) were included in the rating tasks, resulting in a total of 54 participants for the effectiveness rating and 50 participants for the feasibility rating.

In Study 2, of the 110 participants in the brainstorm phase, 37 participants (6 residents, 17 relatives, and 14 professional caregivers) rated the expected effectiveness and 36 participants (6 residents, 16 relatives, and 14 professional caregivers) rated the expected feasibility. Fourteen new participants (3 relatives and 11 professional caregivers) were included in the rating tasks, raising the total number of participants rating effectiveness to 51 and the total number of participants rating feasibility to 50.

Table 2. Socio-demographic factors of participating NH residents for Study 1 and 2.

	Brainstorm, N = 38	Rating effectiveness & feasibility, N = 6
Age, mean (SD) [range]	81.1 (10.4) [57-96]	86.5 (5.3) [80-94]
Sex, female, N (%) / male, N	26 (68.4) / 12	5 (83.3) / 1
Marital status		
Unmarried, N (%)	4 (10.5)	0 (0)
Married or partnered in a registered partnership, N (%)	9 (23.7)	0 (0)
Widowed (after marriage or registered partnership), N (%)	20 (52.6)	6 (100)
Divorced (after marriage or registered partnership), N (%)	5 (13.2)	0 (0)
Educational attainment[a]		
Low, N (%)	30 (81.1)	5 (83.3)
Medium, N (%)	5 (13.5)	0 (0)
High, N (%)	2 (5.4)	1 (16.7)
Care unit		
Medical-somatic care, N (%)	21 (55.3)	6 (100)
Psychogeriatric care, N (%)	6 (15.8)	0 (0)
Mental-physical multimorbidity care, N (%)	11 (28.9)	0 (0)
Depression		
Diagnosed with major depressive disorder or dysthymia, N (%)	10 (28.6)	2 (33.3)
Presence of depressive symptoms, no diagnosis, N (%)	11 (31.4)	1 (16.7)
No depressive symptoms, N (%)	14 (40.0)	3 (50.0)

Note. In both studies (Study 1 and Study 2), the same residents participated. Of the 38 residents that participated in the brainstorm phase, six (15.8%) rated the expected effectiveness and feasibility of the suggested strategies. Valid percentages are shown.
[a]According to the International Standard Classification of Education (ISCED).

Table 3. Socio-demographic factors of participating relatives for Study 1 and 2.

	Study 1			Study 2		
	Brainstorm, N = 25	Rating effectiveness, N = 24	Rating feasibility, N = 20	Brainstorm, N = 22	Rating effectiveness, N = 20	Rating feasibility, N = 19
Age, mean (SD) [range]	59.7 (14.2) [29-83]	57.7 (13.2) [29-83]	58.7 (13.5) [29-83]	58.7 (14.3) [29-83]	58.4 (13.6) [29-83]	58.8 (13.9) [29-83]
Sex, female, N (%) / male, N	17 (68.0) / 8	17 (70.8) / 7	15 (75.0) / 5	14 (63.6) / 8	14 (70.0) / 6	14 (73.7) / 5
Educational attainment[a]						
Low, N (%)	8 (32.0)	7 (29.2)	6 (30.0)	7 (31.8)	6 (30.0)	6 (31.6)
Medium, N (%)	6 (24.0)	4 (16.7)	4 (20.0)	4 (18.2)	4 (20.0)	4 (21.1)
High, N (%)	11 (44.0)	13 (54.2)	10 (50.0)	11 (50.0)	10 (50.0)	9 (47.4)
Kinship						
Residents' partner, N (%)	8 (32.0)	5 (20.8)	5 (25.0)	7 (31.8)	5 (25.0)	5 (26.3)
Residents' son/daughter (-in-law), N (%)	15 (60.0)	17 (70.8)	13 (65.0)	14 (63.6)	13 (65.0)	12 (63.2)
Other, N (%)	2 (8.0)	2 (8.3)	2 (10.0)	1 (4.5)	2 (10.0)	2 (10.5)
Residents' care unit						
Medical-somatic care, N (%)	11 (44.0)	9 (37.5)	6 (30.0)	8 (36.4)	6 (30.0)	6 (31.6)
Psychogeriatric care, N (%)	13 (52.0)	14 (58.3)	13 (65.0)	13 (59.1)	13 (65.0)	12 (63.2)
Mental-physical multimorbidity care, N (%)	1 (4.0)	1 (4.2)	1 (5.0)	1 (4.5)	1 (5.0)	1 (5.3)
Residents' depression						
Diagnosed with major depressive disorder or dysthymia, N (%)	4 (17.4)	3 (13.0)	3 (15.0)	4 (19.0)	3 (15.0)	3 (15.8)
Presence of depressive symptoms, no diagnosis, N (%)	11 (47.8)	12 (52.2)	10 (50.0)	9 (42.9)	11 (55.0)	10 (52.6)
No depressive symptoms, N (%)	8 (34.8)	8 (34.8)	7 (35.0)	8 (38.1)	6 (30.0)	6 (31.6)

Note. The majority of the relatives that participated in the brainstorm phase of Study 1 also generated statements for Study 2 (88%). In the rating tasks of both studies, three new relatives were included. The remainder of the relatives in the rating tasks also participated in the brainstorm phase. Valid percentages are shown.
[a]According to the International Standard Classification of Education (ISCED).

Table 4. Socio-demographic factors of participating professional caregivers for Study 1 and 2.

	Study 1		Study 2	
	Brainstorm, N = 61	Rating effectiveness & feasibility, N = 24	Brainstorm, N = 50	Rating effectiveness & feasibility, N = 25
Age, mean (SD) [range]	43.0 (13.5) [20-66]	40.9 (11.0) [25-58]	43.2 (14.0) [20-66]	42.3 (12.6) [25-61]
Sex, female, N (%) / male, N	52 (86.7) / 8	21 (91.3) / 2	43 (86.0) / 7	22 (88.0) / 3
Educational attainment[a]				
Low, N (%)	8 (13.1)	0 (0)	8 (16.0)	1 (4.0)
Medium, N (%)	30 (49.2)	10 (41.7)	25 (50.0)	10 (40.0)
High, N (%)	23 (37.8)	14 (58.3)	17 (34.0)	14 (56.0)
Type of healthcare provider				
Nursing assistant / certified nursing assistant / registered nurse, N (%)	30 (50.0)	8 (33.3)	26 (53.1)	11 (44.0)
Recreational therapist / activity coordinator / well-being coordinator / musical therapist / spiritual carer / living room assistant, N (%)	15 (25.0)	6 (25.0)	13 (26.5)	5 (20.0)
Physical therapist, N (%)	3 (5.0)	1 (4.2)	1 (2.0)	1 (4.0)
Psychologist, N (%)	5 (8.3)	4 (16.7)	5 (10.2)	4 (16.0)
Nurse specialist / physician / elderly care physician, N (%)	4 (6.7)	3 (12.5)	2 (4.1)	3 (12.0)
Other, N (%)	3 (5.0)	2 (8.3)	2 (4.1)	1 (4.0)
Years of experience, mean (SD) [range]	12.2 (12.6) [0.3-43]	10.9 (10.2) [0.5-32]	12.3 (12.8) [0.3-43]	12.3 (10.6) [0.6-32]
Unit(s) employed				
Medical-somatic care, yes, N (%) / no, N	29 (48.3) / 31	15 (62.5) / 9	23 (46.9) / 26	15 (60.0) / 10
Psychogeriatric care, yes, N (%) / no, N	30 (50.0) / 30	21 (87.5) / 3	21 (42.9) / 28	19 (76.0) / 6
Mental-physical multimorbidity care, yes, N (%) / no, N	25 (41.7) / 35	4 (16.7) / 20	23 (46.9) / 26	6 (24.0) / 19

Note. The majority of the professional caregivers that participated in the brainstorm phase of Study 1 also generated statements for Study 2 (82%). In the rating tasks of both studies, 11 new professionals were included. The remainder of the professionals in the rating tasks also participated in the brainstorm phase. Valid percentages are shown.
[a]According to the International Standard Classification of Education (ISCED).

Study 1: Antidepressant strategies for use by residents

In total, 472 statements were generated by 124 participants. After idea synthesis, the final set of statements contained 83 unique and unambiguously formulated statements. The stress value of Study 1 (0.33 after 15 iterations) was below the recognized upper limit.

During the interpretation workshops, it was agreed that six clusters was the optimum number for representing separate main themes within informal antidepressant care as performed by residents. These clusters were labeled as 1) *Participating in activities* (e.g., 'undertakes creative activities [e.g., flower arranging, painting, crafts, drawing, handicrafts]'), 2) *Reciprocity / having one's own role in interaction* (e.g., 'approaches others in a friendly way'), 3) *Being socially connected* (e.g., 'keeps in touch with his/her family or friends'), 4) *Creating a healthy living environment* (e.g., 'lets in daylight [e.g., opening the curtains]'), 5) *Having a positive perspective* (e.g., 'looks at what is going well'), and 6) *Expressing emotions and opinions* (e.g., 'says what he/she expects of others'). See **Figure 1** for the Cluster Map. **Table A** (**Supplementary materials**) lists the statements that illustrate each cluster and presents average bridging values and rating scores for each cluster and the underlying statements. The bridging values of individual clusters indicated that experts agreed relatively strongly in terms of sorting statements within the clusters *Having a positive perspective* (bridging value = 0.21) and *Expressing emotions and opinions* (bridging value = 0.29), while their level of agreement was relatively low on the clusters *Reciprocity / having one's own role in interaction* (bridging value = 0.64) and *Creating a healthy living environment* (bridging value = 0.66).

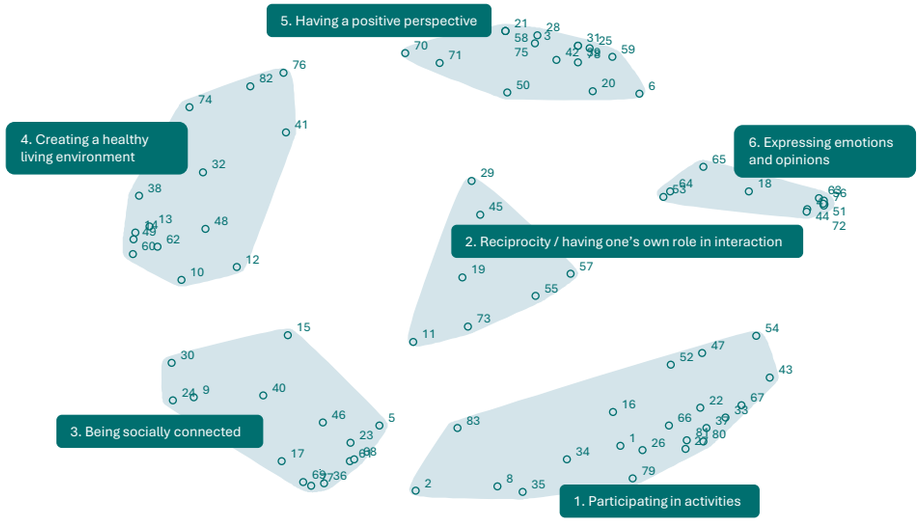

Figure 1. Cluster map for Study 1. Cluster Map with six main themes (clusters) representing informal antidepressant care as may be performed by nursing home residents themselves. Individual statements are indicated by numbers.

Average cluster ratings for effectiveness and feasibility are presented in **Table 5**. In terms of expected effectiveness, the clusters *Being socially connected* (M = 4.0, SD = 0.6) *and Participating in activities* (4.0, 0.6) stood out the most (the overall mean score for effectiveness = 3.9, SD = 0.3), while *Creating a healthy living environment* stood out most in terms of expected feasibility (3.7, 0.4; overall mean score was 3.2, SD = 0.5).

Table 5. Cluster ratings for Study 1, Mean (SD).

Cluster	Rating effectiveness			Rating feasibility				
	Total, N = 54	Residents, N = 6	Relatives, N = 24	Total, N = 50	Residents, N = 6	Relatives, N = 20	Professional caregivers, N = 24
1. Participating in activities	4.0 (0.6)	4.0 (0.3)	3.9 (0.7)	3.2 (0.5)	3.5 (0.2)	3.1 (0.5)	3.1 (0.5)
2. Reciprocity / having one's own role in interaction	3.8 (0.6)	4.2 (0.7)	3.6 (0.6)	3.0 (0.6)	3.5 (0.5)	2.9 (0.5)	2.9 (0.5)
3. Being socially connected	4.0 (0.6)	4.2 (0.2)	4.0 (0.7)	3.1 (0.5)	3.2 (0.2)	3.2 (0.5)	3.0 (0.5)
4. Creating a healthy living environment	3.8 (0.5)	3.5 (0.5)	3.6 (0.5)	3.7 (0.4)	3.8 (0.5)	3.7 (0.4)	3.7 (0.5)
5. Having a positive perspective	3.7 (0.6)	3.7 (0.2)	3.5 (0.6)	3.0 (0.5)	3.3 (0.5)	2.9 (0.4)	3.0 (0.5)
6. Expressing emotions and opinions	3.7 (0.5)	3.8 (0.2)	3.5 (0.5)	3.2 (0.6)	3.7 (0.3)	3.1 (0.6)	3.2 (0.7)

Note. Scores range from 1 (not at all or very limited effectiveness / [almost] never feasible) to 5 (very effective / [almost] always feasible).

Figure 2 (Relative Pattern Match) shows that whereas the clusters *Being socially connected* and *Participating in activities* scored relatively high on effectiveness and relatively low on feasibility, it was the other way around for the cluster *Creating a healthy living environment*. The cluster *Having a positive perspective* scored relatively low on both effectiveness and feasibility.

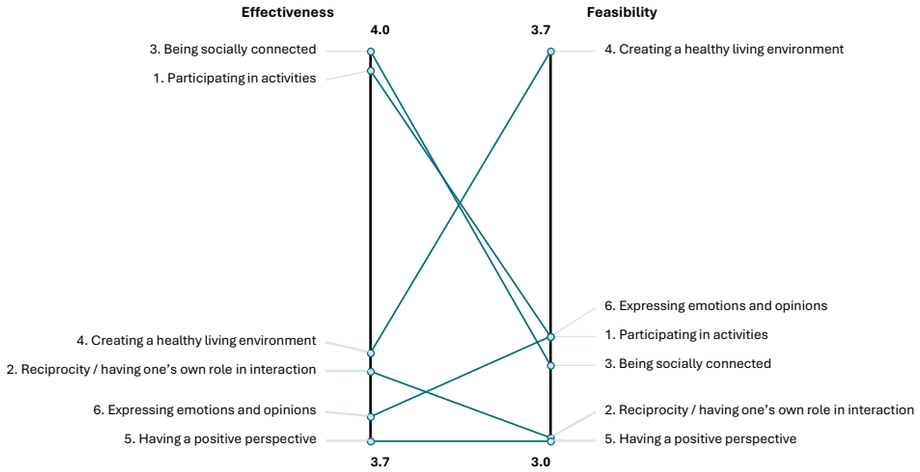

Figure 2. Relative pattern match for Study 1. Relative Pattern Match of the clusters between the dimensions effectiveness and feasibility.

Study 2: Antidepressant strategies for use by people in the residents' social environment

The brainstorm phase with 110 participants yielded 509 statements of strategies that may be applied by people in the residents' social environment, of which 97 were used in the final set of statements after idea synthesis. The study showed an acceptable stress value of 0.31 after eight iterations.

Based on consensus in the interpretation workshops, five clusters were determined to be optimal in representing informal antidepressant care as performed by others important in resident's lives. The clusters were named as follows: 1) *Offering personal attention* (e.g., 'give him/her extra attention when he/she is having a hard time)', 2) *Using positive treatment / approach* (e.g., 'radiate happiness [e.g., enthusiasm, laughter]'), 3) *Stimulating participation* (e.g., 'support him/her in contributing to others [e.g., tell if he/she can help other residents]'), 4) *Using or adapting the physical environment* (e.g., 'create an open environment [e.g., few closed doors, fenced garden accessible to everyone]'), 5) *Activating / encouraging* (e.g., 'stimulate his/her senses [e.g., sniffing, using fragrances, sounds, magic table]'). See **Figure 3** for the Cluster Map and **Table B**

(**Supplementary materials**) for the statements that belong to each cluster, including bridging and average rating scores for each cluster and statement. The bridging values per cluster implied that experts agreed relatively strongly on sorting statements within the clusters *Activating / encouraging* (bridging value = 0.23) and *Offering personal attention* (bridging value = 0.26), but the level of agreement was relatively low on the cluster *Stimulating participation* (bridging value = 0.54).

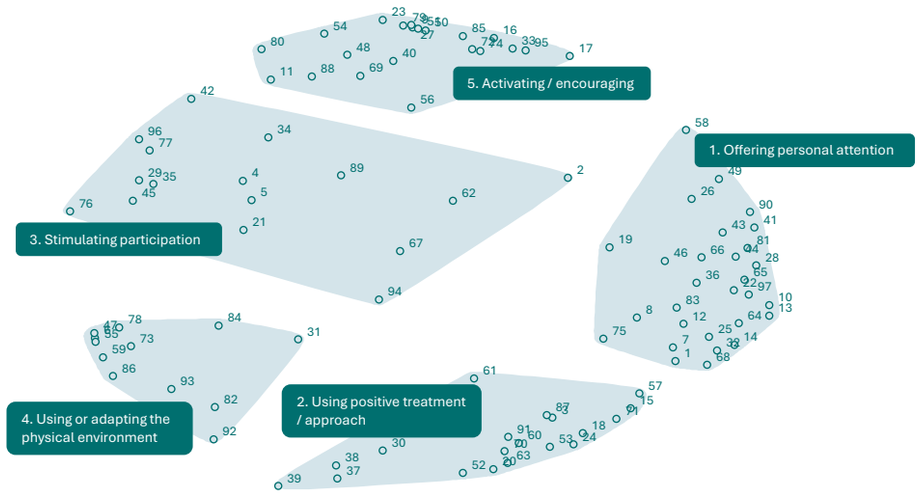

Figure 3. Cluster map for Study 2. Cluster Map with the five main themes (clusters) representing informal antidepressant care as may be performed by significant others. Individual statements are indicated by numbers.

The overall mean score for the statements was 4.0 (SD = 0.3) for effectiveness and 3.7 (SD = 0.5) for feasibility. **Table 6** presents the average cluster ratings. The cluster *Offering personal attention* stood out the most in terms of both expected effectiveness (M = 4.3, SD = 0.3) and feasibility (3.9, 0.4). In terms of expected feasibility, the clusters *Using positive treatment / approach* (3.9, 0.4) and *Using or adapting the physical environment* (3.8, 0.5) stood out as well.

Table 6. Cluster ratings for Study 2, Mean (SD).

	Rating effectiveness			Rating feasibility			
Cluster	Total, N = 51	Residents, N = 6	Relatives, N = 20	Total, N = 50	Residents, N = 6	Relatives, N = 19	Professional caregivers, N = 25
1. Offering personal attention	4.3 (0.3)	4.1 (0.2)	4.3 (0.2)	3.9 (0.4)	3.8 (0.2)	4.0 (0.4)	3.8 (0.5)
2. Using positive treatment / approach	3.9 (0.4)	4.0 (0.2)	3.9 (0.3)	3.9 (0.4)	3.8 (0.3)	3.9 (0.4)	3.9 (0.5)
3. Stimulating participation	3.9 (0.6)	4.2 (0.5)	3.9 (0.3)	3.3 (0.6)	3.6 (0.2)	3.3 (0.6)	3.1 (0.6)
4. Using or adapting the physical environment	4.0 (0.4)	3.9 (0.1)	3.9 (0.4)	3.8 (0.5)	4.1 (0.4)	3.7 (0.5)	3.7 (0.6)
5. Activating / encouraging	4.0 (0.4)	4.0 (0.1)	4.1 (0.3)	3.3 (0.6)	3.3 (0.4)	3.3 (0.6)	3.1 (0.6)
1. Offering personal attention	4.3 (0.3)	4.1 (0.2)	4.3 (0.2)	3.9 (0.4)	3.8 (0.2)	4.0 (0.4)	3.8 (0.5)
2. Using positive treatment / approach	3.9 (0.4)	4.0 (0.2)	3.9 (0.3)	3.9 (0.4)	3.8 (0.3)	3.9 (0.4)	3.9 (0.5)
3. Stimulating participation	3.9 (0.6)	4.2 (0.5)	3.9 (0.3)	3.3 (0.6)	3.6 (0.2)	3.3 (0.6)	3.1 (0.6)
4. Using or adapting the physical environment	4.0 (0.4)	3.9 (0.1)	3.9 (0.4)	3.8 (0.5)	4.1 (0.4)	3.7 (0.5)	3.7 (0.6)
5. Activating / encouraging	4.0 (0.4)	4.0 (0.1)	4.1 (0.3)	3.3 (0.6)	3.3 (0.4)	3.3 (0.6)	3.1 (0.6)

Note. Scores range from 1 (not at all or very limited effectiveness / [almost] never feasible) to 5 (very effective / [almost] always feasible).

The Relative Pattern Match (**Figure 4**) depicts that the cluster *Offering personal attention* scored relatively high on expected effectiveness as well as expected feasibility, while *Stimulating participation* scored relatively low on both effectiveness and feasibility. The clusters *Using or adapting the physical environment* and *Using positive treatment / approach* were considered as not very effective but relatively easy to apply. On the other hand, the cluster *Activating / encouraging* was regarded as relatively effective but relatively impracticable.

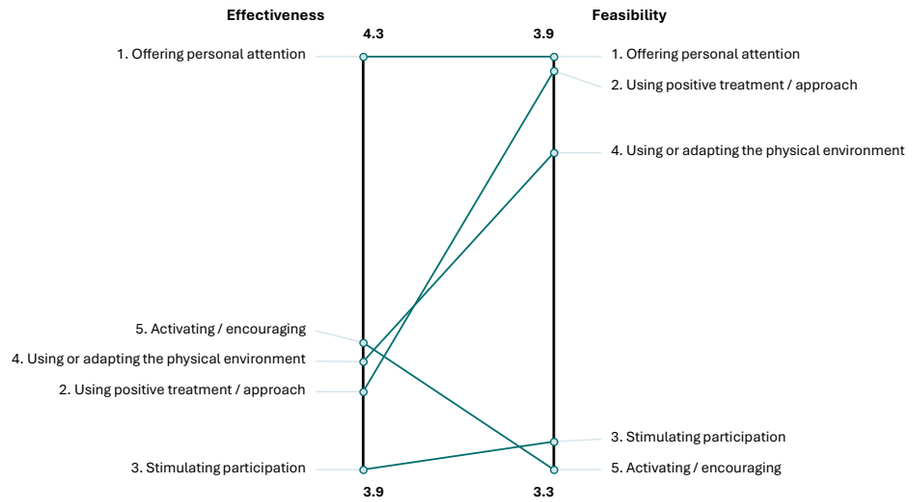

Figure 4. Relative pattern match for Study 2. Relative Pattern Match of the clusters between the dimensions effectiveness and feasibility.

Discussion

Two Group Concept Mapping studies revealed a broad variety of potential informal antidepressant strategies in NH residents. These strategies were sorted into six clusters that may be undertaken by NH residents themselves (*Participating in activities, Reciprocity / having one's own role in interaction, Being socially connected, Creating a healthy living environment, Having a positive perspective,* and *Expressing emotions and opinions*) and five clusters of strategies that may be executed by others involved in residents' lives; i.e., relatives and professional caregivers (*Offering personal attention, Using positive treatment / approach, Stimulating participation, Using or adapting the physical environment,* and *Activating / encouraging*). The results showed that, for strategies for use by residents themselves, the clusters *Being socially connected* and *Participating in activities* were perceived as most effective as was the cluster *Offering personal attention* for strategies by others. Participants perceived *Creating a healthy living environment* as the most feasible cluster with strategies executed by

residents. Within strategies by others, the clusters *Offering personal attention*, *Using positive treatment / approach*, and *Using or adapting the physical environment* were perceived as the most feasible.

The clusters revealed in our GCM studies are consistent with results of previous studies that indicate that, for example, (stimulating) participation, (encouraging) social interaction, and having a positive attitude may promote positive mood in residents (Beerens et al., 2018; Choi et al., 2008; Cohen-Mansfield, 2018; Knippenberg et al., 2021; Meeks & Looney, 2011; Meeks et al., 2007; Owen et al., 2021; Tsai, 2006). Although a previous study showed no longitudinal association between the overall physical environment and depressive symptoms of residents living in care homes (Potter et al., 2018), our results suggest an important role for the physical environment in improving mood in residents, for example, creating a green environment inside the NH by, for example, using plants, smells or photos. Even though the expected effectiveness is relatively moderate, using or adapting elements within the physical environment may be a relatively easy way to influence the mood of residents. It should, however, be noted that in our study, we focused on the beliefs of participants and did not test actual effects of clusters of strategies on residents' depression, nor did we assess whether these strategies are actually put into practice.

Our findings suggest that, although some clusters of strategies could be quite effective, they also appear to be relatively difficult to apply. In contrast, other clusters that seem less effective may be easier to apply. With regard to social connectedness (a cluster for strategies employed by residents themselves that is regarded as relatively effective), it can be argued that physical or cognitive limitations of many NH residents may explain the relatively low expected feasibility. However, Mabire et al. (2016) found that residents with dementia spontaneously interact with other residents and care staff. Our result might be attributed to the fact that we asked participants about expected feasibility, and did not test whether this is actually done.

On the other hand, adapting the physical living environment (a somewhat similar cluster for strategies for use by both residents themselves and by others important in their lives, and considered as quite feasible) and using a positive approach by others important in residents' lives, seem promising in terms of ease of implementation. Future research may shed a light on the compound effect of several feasible strategies with relatively low effectiveness as compared to the effect of strategies that are promising in terms of their effectiveness but difficult to apply in practice.

It should be noted that all clusters were rated 3.0 or above on a scale from 1 to 5 on both effectiveness and feasibility. Moreover, almost all individual statements were scored at least 3.0 on both effectiveness and feasibility. This indicates that the statements revealed in the brainstorm stage were considered at least both moderately

effective and moderately feasible. It makes sense that participants mainly mentioned those strategies that seem realistic in depression care and have some effect on residents' mood. However, the small range of scores makes it difficult to compare specific (clusters of) strategies with each other regarding expected effectiveness and feasibility. Nevertheless, we believe our findings may inform NH practice by prioritizing these strategies.

In general, our findings suggest an important role for social connectedness of residents and a personalized and positive approach by health care professionals and relatives in depression care, which is in accordance with previous research (Cheng et al., 2010; Gilmore-Bykovskyi et al., 2015; Hsu & Wright, 2019; Mackenzie & Abdulrazaq, 2021; Mbakile-Mahlanza et al., 2020; Meeks & Looney, 2011; Nakrem et al., 2011; Sjögren et al., 2013). The results also confirm the results of previous research on the importance of tailored activity programs (e.g., activities that are meaningful for the resident or activities that support autonomy or social engagement) (Harmer & Orrell, 2008; Owen et al., 2021; van Corven et al., 2021) and suggest that adaptations to the physical environment within NHs (e.g., using daylight or creating hominess [cheerful colors, cozy tables]) may be an easy applicable and moderately effective strategy to prevent or alleviate depression in residents.

Strengths and limitations

Using a systematic participatory mixed-methods approach, this research provides a wide range of potential informal antidepressant strategies and their expected effectiveness and feasibility. A diverse group of stakeholders commonly involved in residents' well-being was able to provide their input enabling us to capture a broad view on informal antidepressant strategies in NHs. A major strength of this study is that, in addition to perspectives of relatives and professional caregivers, we included the views of residents themselves regarding strategies that they perform or may perform as well as strategies used or may be used by others. Furthermore, since the cluster structure emerged from the data through multivariate statistics after the statements were sorted by multiple experts, the maps provide a more objective reflection of separate clusters than a solely qualitative approach with fewer participants would have provided.

We observed that more—and more detailed—strategies were mentioned by participants in the group sessions than in individual sessions of the brainstorm phase. This suggests that using group sessions next to individual sessions has added value in collecting a large variety of statements in the brainstorm phase (data triangulation). Therefore, we suggest future research to include group sessions alongside individual sessions when using Group Concept Mapping.

In terms of the results, we noticed commonalities between strategies that can be used by residents (Study 1) and strategies for use by others (Study 2), and similarities in the way they were sorted and rated. However, the data from our two Group Concept Mapping studies cannot be compared using quantitative analysis. Although (mainly) the same participants were involved in both studies, the idea structuring (rating and sorting of the statements) and analysis were performed on a separate set of statements for each study. To gain a comprehensive map of themes of (overarching) informal antidepressant strategies, in-depth qualitative analysis and further research is suggested.

This study has several limitations that should be considered. First, although some strategies could be more effective (or feasible) in particular resident groups, the limited number of participants did not allow us to compare subgroups (e.g., residents with and without dementia or residents with or without depression). Second, the sorting task was done by experts, not by the target group, because of the difficulty of the task and the inability to assist participants face-to-face during the COVID-19 pandemic. Nevertheless, we believe that having experts perform the sorting task was suitable for this study. Third, input of participants in the brainstorm and rating task is essential, and this information was collected accordingly. Unfortunately, due to COVID-19 pandemic restrictions, we were able to collect rating scores from only six residents, which may be problematic for generalizing the results of this study. Finally, this study only assessed potential strategies and their hypothetical effectiveness and feasibility and not whether these strategies were actually used or what their associations with or effects on depression were. Therefore, future research is needed on actual performance of the antidepressant strategies and their subsequent effects.

Conclusion

To the best of our knowledge, our studies are the first to use a systematic bottom-up method to identify and prioritize clusters of informal antidepressant strategies in NHs. Our findings suggest an important role for social connectedness of residents and a personalized and positive approach by those in the residents' (social) environment (e.g., professional caregivers, relatives, and other residents) in depression care in NHs. The importance of tailored activity programs (e.g., activities that are meaningful for the resident or activities that support autonomy or social engagement) and paying attention to the physical environment (e.g., using daylight or creating hominess [cheerful colors, cozy tables]) within NHs was advocated as well. These findings may guide adjustments of existing procedures or may be employed in interventions. More research is needed to test the effectiveness of these strategies and to better understand barriers and facilitators to implementing them in specific resident groups.

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Supplementary materials

Table A. Statements per cluster with bridging and average ratings (SD) for strategies performed by residents themselves (Study 1).

Statements per cluster		Bridging	Effectiveness (N = 54)	Feasibility (N = 50)
Cluster 1: Participating in activities		**0.48 (0.1)**	**4.01 (0.6)**	**3.17 (0.5)**
81.	undertakes activities that feel familiar to him/her.	0.31	4.24 (0.6)	3.55 (0.7)
27.	undertakes creative activities (e.g., flower arranging, painting, crafts, drawing, handicrafts).	0.32	3.82 (0.8)	3.64 (0.8)
80.	undertakes musical activities (e.g., singing, listening to music).	0.34	4.30 (0.7)	3.84 (0.9)
2.	undertakes activities with family or friends.	0.35	4.48 (0.7)	3.40 (0.8)
66.	undertakes relaxing activities (e.g., breathing exercises, mindfulness).	0.38	3.44 (1.1)	2.95 (0.8)
37.	resumes activities that he/she previously enjoyed.	0.38	4.23 (0.9)	3.07 (0.7)
8.	undertakes activities with co-inhabitants (e.g., eating together, walking, playing games).	0.41	4.35 (0.7)	3.79 (0.8)
33.	undertakes activities that require him/her to think (e.g., reading, puzzles).	0.41	3.47 (0.9)	3.35 (0.9)
79.	undertakes activities aimed at physical exertion (e.g., dancing, cycling, walking).	0.41	4.17 (0.8)	3.02 (0.9)
35.	undertakes activities with volunteers (e.g., going to town, playing games).	0.44	4.42 (0.8)	3.41 (0.7)
26.	continues to undertake activities that he/she already did before he/she entered the healthcare institution.	0.44	4.12 (0.7)	2.56 (0.9)
22.	takes the initiative to do something.	0.45	4.14 (0.7)	2.80 (0.9)
16.	remains active despite any limitations.	0.49	4.14 (0.9)	3.09 (0.9)
52.	retrieves precious memories (e.g., looking at personal photos, going to places that evoke memories, recording the course of life).	0.52	4.42 (0.7)	3.70 (0.8)
1.	continues to do what he/she can (e.g., go shopping, take care of plants).	0.52	4.22 (0.8)	3.00 (1.0)
67.	learns new things.	0.54	3.48 (1.0)	2.44 (0.9)
83.	talks about current affairs.	0.57	3.51 (0.8)	2.79 (0.9)

Table A. Continued

Statements per cluster	Bridging	Effectiveness (N = 54)	Feasibility (N = 50)
34. carries out activities that are useful within the department (e.g., helping with washing up, cooking, gardening).	0.59	4.06 (0.7)	3.40 (0.9)
43. is planning something to look forward to.	0.65	4.00 (0.9)	2.98 (0.9)
47. seeks distraction.	0.73	3.68 (0.9)	3.09 (0.8)
54. is open to new experiences.	0.83	3.46 (0.9)	2.64 (0.8)
Cluster 2: Reciprocity / having one's own role in interaction	**0.64 (0.1)**	**3.75 (0.6)**	**2.98 (0.6)**
11. approaches others in a friendly way.	0.56	3.55 (0.9)	3.50 (0.7)
73. shares precious memories with others (e.g., telling stories, viewing photos together).	0.56	4.42 (0.8)	3.57 (0.8)
55. engages in in-depth discussions (e.g., on content issues).	0.57	3.23 (0.9)	2.25 (0.9)
57. makes friends.	0.59	3.73 (0.8)	3.36 (0.7)
29. is aware of what his/her behavior can do to others.	0.67	3.27 (1.0)	2.29 (0.8)
19. talks about things that are important within the healthcare institution or department (e.g., type of activities that are offered).	0.76	3.84 (0.8)	3.04 (0.9)
45. continues to make his/her own choices (e.g., what his/her day looks like).	0.79	4.22 (0.7)	2.87 (0.9)
Cluster 3: Being socially connected	**0.47 (0.2)**	**4.03 (0.6)**	**3.12 (0.5)**
77. keeps in touch with his/her family or friends.	0.18	4.44 (0.6)	3.50 (0.7)
69. maintains contacts outside the care institution.	0.20	4.06 (0.8)	2.60 (0.9)
36. contacts people who share the same interests or have a similar life history.	0.22	4.21 (0.8)	3.25 (0.7)
17. visits other residents.	0.28	3.96 (0.9)	3.69 (0.8)
68. gets to know others.	0.32	3.83 (0.9)	3.20 (0.7)
61. is open to new contacts.	0.34	3.94 (0.7)	3.19 (0.8)
23. takes the initiative to make contacts.	0.38	4.08 (0.7)	2.94 (0.9)

Table A. Continued

Statements per cluster	Bridging	Effectiveness (N = 54)	Feasibility (N = 50)
46. makes physical contact with people (e.g., cuddling, shaking or holding hands).	0.40	4.18 (0.6)	3.66 (0.8)
5. makes contact with healthcare providers.	0.53	4.08 (0.8)	3.82 (0.7)
40. has contact with animals.	0.67	3.79 (0.9)	3.05 (0.9)
24. is socially active (e.g., by association).	0.74	3.67 (1.0)	2.23 (1.0)
9. helps others with practical matters (e.g., eating, taking them somewhere).	0.75	3.84 (0.9)	2.93 (1.0)
15. goes outside (e.g., walking outside, going to a garden or park).	0.76	4.58 (0.8)	3.23 (0.9)
30. contributes to society.	0.79	3.74 (0.9)	2.32 (0.8)
Cluster 4: Creating a healthy living environment	**0.66 (0.2)**	**3.77 (0.5)**	**3.70 (0.4)**
14. lets in daylight (e.g., opening the curtains).	0.33	3.80 (0.9)	4.39 (0.6)
13. puts flowers or plants in his/her room.	0.41	3.67 (0.7)	4.17 (0.9)
62. lets in fresh air (e.g., opening the window).	0.43	3.80 (0.9)	4.10 (0.9)
74. follows doctor's advice (e.g., taking medication).	0.46	3.79 (0.8)	3.79 (0.7)
76. is open to psychological treatment.	0.62	3.80 (0.8)	3.02 (0.8)
82. talks to a psychologist.	0.64	3.76 (0.8)	3.21 (0.8)
49. looks well-groomed (dressing nicely, going to a hairdresser or for a pedicure).	0.65	4.02 (0.8)	4.02 (0.6)
12. looks outside (e.g., at the surroundings, birds, events in the street).	0.67	3.40 (0.9)	4.06 (0.9)
60. has good daily structure.	0.68	3.91 (0.8)	3.33 (0.8)
48. puts personal belongings in his/her room (e.g., photos, own locker).	0.77	4.12 (0.8)	4.40 (0.6)
41. talks to a pastor or spiritual counselor.	0.84	3.37 (1.0)	3.29 (0.8)
32. eats healthily.	0.84	3.60 (0.8)	3.64 (0.7)
10. ensures a good balance between being active and resting.	0.89	3.88 (0.8)	3.31 (0.8)
38. contributes to others (e.g., supporting someone who is struggling).	1.00	3.90 (0.9)	2.98 (0.8)

Table A. Continued

Statements per cluster	Bridging	Effectiveness (N = 54)	Feasibility (N = 50)
Cluster 5: Having a positive perspective	**0.21 (0.2)**	**3.69 (0.6)**	**2.97 (0.5)**
28. is kind to him/herself.	0.00	3.60 (0.8)	2.87 (0.7)
21. is at peace with the fact that he/she is staying in a care institution.	0.02	3.52 (0.9)	2.80 (0.8)
58. accepts that he/she sometimes feels gloomy.	0.02	3.51 (0.9)	2.70 (0.8)
75. accepts that aging includes physical limitations.	0.02	3.67 (0.9)	2.70 (0.8)
31. realizes that things could be worse.	0.03	3.28 (0.9)	2.71 (0.7)
39. looks at what is going well.	0.03	3.90 (1.0)	3.02 (1.0)
25. keeps hope (e.g., trusting that things will be all right or get better).	0.04	3.52 (0.8)	2.62 (0.8)
3. has realistic expectations.	0.05	3.38 (0.9)	2.65 (0.7)
59. speaks encouragingly.	0.13	3.61 (0.8)	2.89 (0.8)
78. focuses on fun things.	0.22	4.32 (0.8)	3.40 (0.6)
42. enjoys little things (e.g., good food, the weather).	0.24	4.34 (0.6)	3.96 (0.8)
20. uses humor.	0.40	4.02 (0.7)	3.80 (0.7)
71. accepts help.	0.45	3.66 (0.8)	3.00 (0.9)
6. keeps a book with pleasant thoughts.	0.52	3.69 (1.1)	2.77 (1.0)
50. looks for new ways of dealing with problems.	0.53	3.55 (1.0)	2.49 (0.8)
70. relies on faith, religion, or spirituality.	0.57	3.51 (1.0)	3.22 (0.8)
Cluster 6: Expressing emotions and opinions	**0.29 (0.1)**	**3.71 (0.5)**	**3.17 (0.6)**
56. says what he/she expects of others.	0.15	3.37 (0.8)	2.83 (0.8)
63. says what he/she needs.	0.16	3.85 (0.7)	3.20 (0.9)

Table A. Continued

Statements per cluster	Bridging	Effectiveness (N = 54)	Feasibility (N = 50)
7. says what he/she thinks is important.	0.17	4.04 (0.7)	3.38 (0.8)
51. indicates his/her limits.	0.18	3.64 (0.7)	2.98 (0.8)
72. says what he/she likes (e.g., what music is played, how he/she wants to be cared for, with whom he/she sits at the table).	0.18	4.10 (0.6)	3.45 (0.8)
4. expresses his/her opinion.	0.30	3.80 (0.9)	3.54 (0.9)
44. says so when he/she disagrees with something.	0.31	3.75 (0.7)	3.39 (0.8)
18. asks for help.	0.32	3.28 (0.9)	3.20 (0.8)
64. expresses his/her emotions (e.g., by talking about it, sharing frustrations, seeking recognition).	0.38	3.88 (0.7)	2.93 (1.0)
65. expresses his/her enthusiasm.	0.49	3.81 (0.8)	3.21 (0.8)
53. shows his/her vulnerability to others.	0.52	3.30 (0.8)	2.67 (0.7)

Note. Since participants were asked to generate specific statements by completing 'focus prompts' from their own perspective, the resulting formulation of the statements in the version for nursing home residents differs slightly from the formulation of the statements in the version for relatives and professional caregivers (as presented above). For example, statement 81 read 'undertake activities that feel familiar to me' in the version for nursing home residents.

Table B. Statements per cluster with bridging and average ratings (SD) for strategies performed by others important in residents' lives (Study 2).

Statements per cluster	Bridging	Effectiveness (N = 51)	Feasibility (N = 50)
Cluster 1: Offering personal attention	**0.26 (0.1)**	**4.25 (0.3)**	**3.92 (0.4)**
97. give him/her extra attention when he/she is having a hard time.	0.09	4.41 (0.5)	3.78 (0.8)
22. give him/her attention in addition to the usual care times.	0.11	4.46 (0.6)	3.41 (0.9)
64. just be there, without saying anything.	0.13	3.98 (0.7)	3.93 (0.8)
65. give him/her the space to express emotions.	0.13	4.02 (0.6)	3.83 (0.7)
14. offer him/her security (e.g., make him/her feel safe, tuck him/her in).	0.16	4.09 (0.6)	3.76 (0.7)
10. ask why he/she feels gloomy.	0.18	3.80 (0.7)	3.79 (0.7)
32. reassure or comfort him/her.	0.19	4.11 (0.6)	4.02 (0.6)
68. make physical contact (e.g., give a hug, give/hold hand, put hand on shoulder).	0.19	4.30 (0.6)	4.07 (0.8)
28. show that he/she matters.	0.19	4.33 (0.7)	4.10 (0.5)
12. pamper him/her.	0.19	4.17 (0.7)	3.56 (0.9)
25. listen to what he/she has to say.	0.20	4.36 (0.5)	3.98 (0.7)
13. take time for personal stories.	0.20	4.45 (0.6)	3.50 (0.9)
36. show interest in him/her.	0.21	4.37 (0.6)	4.00 (0.7)
1. show that he/she is understood.	0.21	4.33 (0.6)	3.80 (0.7)
7. greet him/her in the hallway.	0.22	4.02 (0.6)	4.59 (0.6)
44. ask for his/her opinion.	0.24	4.13 (0.6)	4.05 (0.6)
83. compliment him/her.	0.24	4.40 (0.5)	4.26 (0.5)
81. give him/her the feeling that he/she is allowed to be who he/she is.	0.27	4.21 (0.5)	3.97 (0.6)
8. support him/her.	0.28	4.07 (0.5)	3.82 (0.7)
41. know what he/she likes.	0.29	4.25 (0.6)	3.91 (0.6)
66. go with him/her into a story without asking questions.	0.30	3.76 (0.7)	3.60 (0.8)
90. show interest in his/her life story.	0.30	4.52 (0.6)	4.10 (0.7)

Table B. Continued

Statements per cluster	Bridging	Effectiveness (N = 51)	Feasibility (N = 50)
43. have an informal chat with him/her.	0.31	4.29 (0.6)	4.12 (0.6)
75. see him/her as a fellow human being, not as a patient.	0.33	4.15 (0.5)	4.08 (0.7)
46. connect to his/her world of experience.	0.34	4.44 (0.6)	3.95 (0.6)
19. create little moments of happiness.	0.39	4.59 (0.7)	4.05 (0.7)
49. take into account his/her wishes and needs (e.g., what time to get up, table layout, eating preferences)	0.44	4.23 (0.5)	3.55 (0.9)
26. match his/her interests.	0.49	4.31 (0.6)	3.88 (0.7)
58. retrieve fond memories with him/her (e.g., having conversations about the past, looking at photos).	0.63	4.60 (0.5)	4.17 (0.8)
Cluster 2: Using positive treatment / approach	**0.33 (0.2)**	**3.94 (0.4)**	**3.89 (0.4)**
70. radiate happiness (e.g., enthusiasm, laughter).	0.21	4.17 (0.6)	4.22 (0.6)
53. communicate with him/her without using words (e.g., images, dance, music).	0.22	3.64 (0.8)	3.17 (0.9)
63. use a quiet voice volume.	0.22	4.02 (0.6)	4.19 (0.7)
15. look at him/her when talking to him/her.	0.23	4.16 (0.6)	4.56 (0.5)
20. communicate clearly with him/her (e.g., say what you are coming to do, when you are coming, summarize).	0.23	4.00 (0.6)	4.12 (0.6)
60. use humor.	0.23	4.20 (0.5)	4.02 (0.5)
24. radiate peace (do not rush, take your time).	0.24	4.26 (0.6)	3.75 (0.9)
3. talk in a cheerful tone.	0.24	3.80 (0.8)	4.07 (0.6)
57. approach him/her respectfully.	0.26	4.28 (0.6)	4.33 (0.6)
87. emphasize positive things.	0.27	4.33 (0.5)	4.22 (0.5)
52. say what you expect of him/her.	0.27	3.37 (0.7)	3.54 (0.8)
18. be honest with him/her.	0.28	3.95 (0.9)	3.98 (0.7)
71. show that he/she does not have to feel guilty.	0.31	3.85 (0.7)	3.95 (0.7)

Table B. Continued

Statements per cluster		Bridging	Effectiveness (N = 51)	Feasibility (N = 50)
91.	enjoy each other's company.	0.35	4.05 (0.6)	4.08 (0.7)
39.	do not immediately expect him/her to feel better after trying to cheer him/her up.	0.40	3.50 (0.7)	3.51 (0.8)
38.	do not wish to solve everything immediately (e.g., sometimes accept the situation as it is).	0.42	3.65 (0.8)	3.49 (0.7)
30.	think in terms of solutions.	0.50	3.43 (0.9)	3.60 (0.9)
61.	be alert to non-verbal signals.	0.51	4.24 (0.6)	3.70 (1.0)
37.	know how to deal with depressive complaints.	0.84	3.82 (0.8)	3.33 (0.9)
Cluster 3: Stimulating participation		**0.54 (0.1)**	**3.86 (0.6)**	**3.31 (0.6)**
34.	support him/her in practical matters (administration, housekeeping, use of online appliances).	0.40	3.09 (0.9)	3.21 (1.1)
4.	set realistic goals together with him/her.	0.40	3.38 (0.9)	2.86 (1.0)
35.	support him/her in contributing to others (e.g., tell if he/she can help other residents).	0.40	3.72 (0.9)	3.10 (0.9)
77.	connect him/her with residents with the same interests.	0.41	4.26 (0.6)	3.39 (0.9)
29.	inform him/her about what is going on in society.	0.43	2.98 (0.8)	3.42 (0.8)
96.	ensure that he/she has contact with children (e.g., visits from (grand)children or elementary school students).	0.44	4.30 (0.7)	3.03 (0.8)
45.	encourage social interaction (e.g., organization of group activities).	0.47	4.26 (0.7)	3.67 (0.7)
89.	let him/her do as much as possible on his/her own.	0.47	4.24 (0.7)	3.40 (0.9)
42.	take him/her home (only applicable for relatives).	0.57	4.02 (1.1)	2.77 (1.2)
67.	let him/her decide for himself/herself as much as possible.	0.58	4.15 (0.7)	3.24 (1.0)
62.	give him/her the feeling that he/she can do it on his/her own.	0.61	4.21 (0.6)	3.71 (0.8)
21.	support him/her in looking groomed.	0.62	3.75 (0.7)	3.82 (0.8)
5.	connect him/her with residents with a similar life story.	0.62	3.89 (0.9)	2.82 (1.0)
2.	come to visit.	0.67	4.38 (0.8)	3.34 (0.9)
76.	support him/her with a healthy diet.	0.72	3.63 (0.8)	3.61 (0.9)

Table B. Continued

Statements per cluster		Bridging	Effectiveness (N = 51)	Feasibility (N = 50)
94.	inform him/her about your own experiences.	0.78	3.59 (0.7)	3.74 (0.7)
Cluster 4: Using or adapting the physical environment		**0.41 (0.3)**	**3.96 (0.4)**	**3.77 (0.5)**
59.	create an open environment (e.g., few closed doors, fenced garden accessible to everyone).	0.04	4.12 (0.6)	2.75 (1.0)
55.	use daylight (e.g. open curtains, place him/her next to the window).	0.04	4.04 (0.5)	4.54 (0.7)
6.	create a green environment within the nursing home (e.g., plants, smells, photos).	0.04	4.07 (0.7)	3.50 (0.9)
86.	create hominess (cheerful colors, cozy tables).	0.05	4.15 (0.6)	3.90 (0.8)
47.	create a green environment outside the nursing home (e.g., vegetable garden, animal park, flower garden).	0.08	4.07 (0.7)	3.12 (0.9)
73.	place him/her in such a way that he/she can look outside.	0.41	3.95 (0.7)	4.38 (0.8)
78.	place recognizable objects from the past in his/her room.	0.42	3.98 (0.6)	4.02 (0.8)
93.	consider his/her room as private space, not as work (e.g., knock before entering).	0.63	4.06 (0.5)	4.17 (0.8)
92.	also continue to take care of yourself (e.g., take time for yourself, express your own feelings).	0.74	3.73 (0.7)	3.49 (0.9)
84.	support him/her in communicating with his/her family.	0.75	3.79 (0.8)	3.83 (0.9)
82.	ensure that he/she knows who is who (e.g., photographic wall of employees, having employees wear a badge or introduce themselves by name).	0.77	4.00 (0.6)	3.92 (0.9)
31.	pay attention to meaning, faith, or spirituality.	1.00	3.56 (0.9)	3.50 (0.9)
Cluster 5: Activating / encouraging		**0.23 (0.2)**	**3.98 (0.4)**	**3.27 (0.6)**
9.	continue to offer new activities.	0.00	3.84 (0.7)	2.93 (0.8)
27.	encourage him/her to go out (e.g., take regional taxi).	0.01	3.72 (1.2)	2.81 (1.2)
51.	encourage him/her to participate in musical activities (e.g., singing, listening to music).	0.02	4.26 (0.6)	3.68 (0.8)
50.	go on trips with him/her (e.g., eating out together, going to the movies or a museum).	0.03	4.30 (0.9)	2.74 (1.1)
23.	encourage him/her to move.	0.08	4.02 (0.7)	3.49 (0.8)
85.	also take part in activities (e.g., playing cards).	0.15	4.07 (0.5)	3.15 (1.0)

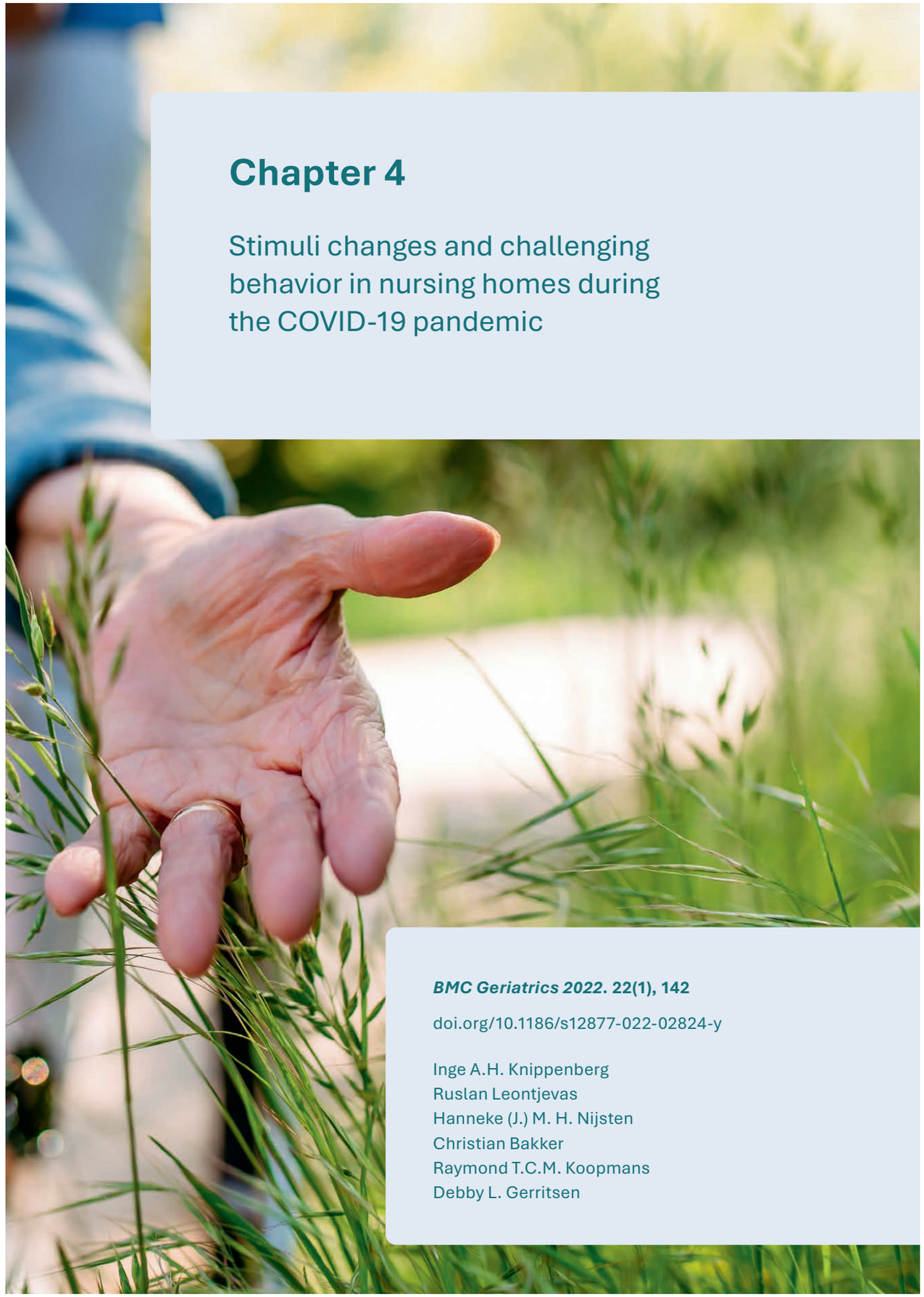
Table B. Continued

Statements per cluster		Bridging	Effectiveness (N = 51)	Feasibility (N = 50)
79.	stimulate his/her senses (e.g., sniffing, using fragrances, sounds, magic table).	0.15	4.12 (0.8)	3.49 (1.0)
69.	support him/her in carrying out activities that are useful (e.g., peeling potatoes, cooking, setting the table, gardening).	0.18	4.00 (0.5)	3.60 (0.9)
74.	offer activities that fit in with what he/she is capable of.	0.19	4.22 (0.6)	3.55 (0.9)
72.	start the day together with a fun activity.	0.19	4.36 (0.7)	3.13 (1.0)
48.	encourage him/her to (continue to) participate in society (e.g., being part of an association).	0.20	3.58 (0.9)	2.57 (1.0)
40.	ensure that he/she can be engaged online (e.g., ensuring a good connection, offering online activities).	0.25	2.70 (1.0)	2.49 (1.0)
16.	offer activities focused on his/her past (e.g., previous hobby or profession).	0.25	4.36 (0.7)	3.22 (0.8)
54.	encourage him/her to go outside.	0.27	4.09 (0.6)	3.51 (0.9)
80.	ensure a good balance between being active and resting.	0.29	4.00 (0.5)	3.61 (0.8)
95.	make sure that you do things with him/her that you like.	0.30	3.90 (0.6)	3.66 (0.7)
11.	offer support in his/her daily structure.	0.33	3.93 (0.7)	3.48 (0.8)
33.	offer him/her something to look forward to.	0.36	4.16 (0.9)	3.56 (0.8)
17.	do a small activity together (e.g., going through the day together, watching the birds).	0.47	4.42 (0.6)	3.90 (0.8)
88.	ensure contact with animals (e.g., aquarium, farm).	0.47	3.97 (0.7)	2.89 (0.9)
56.	be creative (e.g., trying out new things, thinking outside the box).	0.62	3.57 (0.7)	3.14 (0.9)

Note. Since participants were asked to generate specific statements by completing 'focus prompts' from their own perspective, the resulting formulation of the statements in the version for nursing home residents differs slightly from the formulation of the statements in the version for relatives and professional caregivers (as presented above). For example, statement 97 read 'give me extra attention when I am having a hard time' in the version for nursing home residents.

Chapter 4

Stimuli changes and challenging behavior in nursing homes during the COVID-19 pandemic



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Inge A.H. Knippenberg
Ruslan Leontjevas
Hanneke (J.) M. H. Nijsten
Christian Bakker
Raymond T.C.M. Koopmans
Debby L. Gerritsen

Abstract

Background: COVID-19 restrictions in nursing homes resulted in a reduction in stimuli for residents. This study aimed to explore observed effects of changes in stimuli, both targeted (e.g., planned recreational activities) and untargeted (e.g., spontaneous noise), on challenging behavior in nursing home residents during COVID-19 anti-pandemic measures.

Methods: In an online survey, nursing home healthcare professionals in the Netherlands provided their perspectives on the effects of the reduction in untargeted stimuli on residents with mild, advanced, or no dementia, and on different types of challenging behavior (i.e., psychotic, depressed, anxious, agitated, or apathetic behavior). Additionally, we asked participants' opinions about strategies for limiting untargeted stimuli and for adjusting targeted stimuli for optimal management of challenging behaviors.

Results: In total, 199 professionals completed the survey. Residents with advanced dementia and those with psychotic and agitated behavior seemed to benefit from the reductions in stimuli not specifically targeted at the resident. In contrast, residents without dementia and those with depressive and apathetic behavior seemed to be negatively affected by reductions in untargeted stimuli. Participants would like to continue reducing untargeted stimuli in the future (e.g., limiting the use of corridors adjacent to residents' rooms) and to adapt existing or introduce new initiatives involving targeted stimuli (e.g., small-scale, individually tailored activities). Responses to open-ended questions revealed additional initiatives that could be useful in nursing home care.

Conclusions: This study provided lessons to learn from the COVID-19 measures in nursing homes. While many residents may have been negatively affected by the restrictions imposed during the pandemic, specific resident groups may have benefitted from the reduction in untargeted stimuli and from the adjustments made to daily activities. Various strategies and initiatives used in nursing homes during the pandemic seem promising for meeting individual needs in managing challenging behavior. These findings suggest that certain stimuli may affect specific resident groups differently. This underlines the importance of finding the right balance between stimuli and tranquility, tailored to the needs of individual residents. It is important to consider the stimuli present in nursing homes, whether targeted or untargeted, when analyzing and treating challenging behavior.

Background

Challenging behavior is common in nursing home (NH) residents, especially in those with dementia (Selbæk et al., 2013). Previous studies suggest that environmental stimuli can influence challenging behavior in residents (Garcia et al., 2012; Janus et al., 2020; Möhler et al., 2018). In our prior study, NH staff consistently reported that changes in such stimuli due to COVID-19 restrictions affected challenging behaviors in different ways (Leontjevas et al., 2020). The experiences and insights of healthcare professionals who observed the effects of the COVID-19 restrictions on challenging behavior in specific resident groups can be used to improve future NH care.

To limit the spread of COVID-19, the Dutch government imposed a nationwide ban on NH visits in the Netherlands, which took effect on March 19, 2020 (Kruse et al., 2020). In addition, most non-care-related activities, such as recreational activities, were discontinued or adjusted in many NHs. It has been recognized that COVID-19 measures have resulted in negative psychological and behavioral consequences for older adults with and without dementia (Briggs et al., 2021; Cagnin et al., 2020; Giebel, Cannon, et al., 2020; Giebel, Lord, et al., 2020; Lara et al., 2020; Liu et al., 2021; Manca et al., 2020; Simonetti et al., 2020). Likewise, studies in long-term care settings have found increases in depression, anxiety, loneliness, and behavioral problems that were attributed to the COVID-19 restrictions (Arpacıoğlu et al., 2021; Benzinger et al., 2021; El Haj et al., 2020; Kaelen et al., 2021; Koopmans et al., 2021; Levere et al., 2021; Van der Roest et al., 2020).

On the other hand, some studies have suggested that pandemic measures may have had neutral or positive effects and may have been associated with no changes in behavior or even with improved behavioral outcomes for some residents. For example, one study found that the majority of people with Alzheimer's disease showed no changes in neuropsychiatric symptoms during the quarantine (Boutoleau-Bretonnière et al., 2020). Moreover, our study suggested both increased and decreased challenging behavior in NH residents while the COVID-19 restrictions were in place (Leontjevas et al., 2020).

A possible explanation for these results is that particular resident groups (e.g., residents with or without dementia) experienced the effects of the COVID-19 restrictions differently (Benzinger et al., 2021; Leontjevas et al., 2020; Van der Roest et al., 2020). As residents with dementia are more susceptible to sensory overstimulation (Garcia et al., 2012; Janus et al., 2020; Lawton & Nahemow, 1973), it can be argued that the reductions in unintentional stimuli (e.g., loud noises in the corridors) as a result of the restrictions may have had a beneficial effect on some residents. Additionally, to mitigate the effects of these restrictions, many NHs deployed adjusted or new initiatives, such as providing individual activities instead of group activities and

providing support for online communication between residents and their relatives (Fearn et al., 2021; Leontjevas et al., 2020; McArthur et al., 2021; Sizoo et al., 2020; Wammes et al., 2020). Some of these strategies may have had beneficial effects on challenging behavior and may possibly continue to do so, even in a post COVID-19 era.

The measures taken to slow the spread of the COVID-19 virus provided a unique situation. The experiences of NH professionals may reveal important lessons for future management of challenging behavior in particular resident groups. Hence, this study aimed to explore NH professionals' opinions and observations of the way changes in stimuli brought about by the COVID-19 restrictions affected specific groups (i.e., residents with no, mild, or advanced dementia) and different types of challenging behavior (i.e., psychotic, depressed, anxious, agitated, or apathetic). This study also analyzed professionals' perceptions of proposals to limit stimuli in the future, and opinions about whether adjustments made to certain stimuli as a result of the COVID-19 restrictions and the new activities implemented during this time should be kept after the pandemic. In this study, we distinguish between stimuli specifically targeted at residents, such as organized activities, and stimuli not specifically targeted at residents, such as unintentional noise in the corridors.

Methods

Study design and procedure

An online survey was conducted among NH professionals between November 10, 2020 and January 22, 2021, during the second wave of the pandemic in the Netherlands. We used three methods to recruit participants. First, we invited those NH professionals who had participated in the previous study and had given us permission to contact them for a follow-up survey. Second, we recruited NH activity therapists by contacting a selection of Dutch NH organizations (specifically, every sixth organization in a comprehensive list of Dutch NHs). Finally, we recruited additional participants (psychologists, elderly care physicians, nurse specialists, and activity therapists) through our LinkedIn and professional networks.

Ethics

This study adhered to the World Medical Association Declaration of Helsinki (2013) (World Medical Association, 2013) as well as relevant applicable guidelines in the Netherlands. All participants were informed about the aim of the study and provided online informed consent. Data remained anonymous during the collection, analysis, and storage processes. According to the guidelines of the Medical Ethics Review Committee at the Radboud university medical center Nijmegen, the Netherlands, the

study does not fall under the scope of the Dutch Medical Research Involving Human Subjects Act (WMO) (CCMO, 2020).

Survey

The survey was developed using topics that emerged from a previous study conducted during the pandemic's first wave about the extent to which anti-pandemic measures affected challenging behavior (Leontjevas et al., 2020). In the current study, we asked participants to provide their demographic information such as age and gender, as well as their observations regarding the effects of COVID-19 measures on specific resident groups within three topics: (1) stimuli that were not specifically targeted at the resident (untargeted stimuli), (2) stimuli that were specifically targeted at the resident (targeted stimuli), and (3) online communication. The latter topic was analyzed in a separate study (Leontjevas et al., 2021).

A structured questionnaire was used to collect participants' observations of the effects of stimuli changes on challenging behavior in residents and participants' opinions about whether to retain certain strategies within these topics (e.g., limiting the use of corridors adjacent to residents' rooms by suppliers and staff as strategy to reduce untargeted stimuli). In the instructions of this questionnaire, we provided a definition and examples of untargeted stimuli (i.e., "Events that take place around a resident, without being specifically targeted at the resident. For example, people walking down the corridor or actions that take place in communal areas.") and targeted stimuli (i.e., "Targeted interaction with the resident refers to events in which the resident is involved purposefully. For example, provided activities, therapies, or visits from loved ones."). Professionals were given the opportunity, through open-ended questions, to elaborate on their answers, provide in-depth information, or add strategies and ideas to the questionnaire's predefined categories.

We asked participants to consider three resident groups: those without dementia, those with mild dementia, and those with advanced dementia when responding to questions regarding the effects of the changes in stimuli on residents' challenging behavior. We also asked participants to consider different types of challenging behavior categorized according to the classifications provided in the Dutch guideline for challenging behavior (i.e., psychotic, depressed, anxious, agitated, or apathetic) (Zuidema et al., 2018).

For example, regarding untargeted stimuli, we asked participants to complete a statement on a seven-point scale ranging from "a strong decrease" to "a strong increase": "Reducing untargeted stimuli leads to [..] in challenging behavior in most residents without dementia." In terms of targeted stimuli, we asked whether

participants wanted to continue the practice of organizing activities in small groups, asking them to respond with one of three options: "yes," "no," or "don't know."

Participants

A total of 199 professionals in NH care (78 psychologists, 42 elderly care physicians and nurse specialists, 69 activity therapists, and 10 other professionals) completed the survey. Of those, 181 (91%) were female, and the mean age was 42 years (*SD* = 12.6) (see **Table 1**).

Analyses

We analyzed participants' responses to the closed questions through descriptive statistics using SPSS 25. Responses to the open-ended questions were coded using a conventional approach (Hsieh & Shannon, 2005) with the help of ATLAS.ti (version 8). One researcher (IK) coded all responses. These codings were checked by another researcher (RL), and, subsequently, interpretations were discussed among the two researchers to reach consensus.

Results

Untargeted stimuli

Resident groups and type of challenging behavior

Two-thirds of the participants (66%) observed an increase in challenging behavior among most residents without dementia when untargeted stimuli decreased because of the COVID-19 restrictions (see **Table 2**). An even larger number of participants (77%) observed a decrease in challenging behavior under the same circumstances among most residents with advanced dementia. In particular, a decrease in psychotic behavior (51%) and agitated behavior (64%) was observed, while residents' depressive behavior (73%) and apathetic behavior (69%) increased, according to most participants. Many participants (44%) noticed an increase in residents' anxious behavior, while others (36%) perceived a decrease.

Table 1. Demographic characteristics of participants.

	Total (N = 199)	Psychologists (N = 78)	Elderly care physicians and nurse specialists (N = 42)	Activity therapists (N = 69)	Other professionals (N = 10)
Age, mean (SD) [range]	42.3 (12.6) [21-73]	37.0 (10.7) [23-63]	45.0 (12.5) [25-73]	45.8 (12.7) [21-66]	48.3 (12.7) [24-61]
Sex, female, N (%) / male, N	181 (91.0%) / 18	71 (91.0%) / 7	34 (81.0%) / 8	66 (95.7%) / 3	10 (100.0%) / 0
Years working in current organization, median (25-75%) [range]	4 (2-12) [0-40]	4 (2-9) [1-25]	6 (2-12) [0-31]	4 (2-16) [1-40]	7 (2.75-12.75) [1-27]

Note. The other professionals were six nurses, two case managers, a spiritual counselor, and a music therapist.

Table 2. Observed changes in challenging behavior in most residents due to a reduction of untargeted stimuli.

	N	Decrease	No change	Increase	Don't know
Challenging behavior per resident group					
No dementia	197	28 (14.2%)	23 (11.7%)	129 (65.5%)	17 (8.6%)
Mild dementia	194	90 (46.4%)	12 (6.2%)	84 (43.3%)	8 (4.1%)
Advanced dementia	195	150 (76.9%)	14 (7.2%)	23 (11.8%)	8 (4.1%)
Type of challenging behavior					
Psychotic	194	99 (51.0%)	37 (19.1%)	35 (18.0%)	23 (11.9%)
Depressive	189	21 (11.1%)	25 (13.2%)	137 (72.5%)	6 (3.2%)
Anxious	194	86 (44.3%)	30 (15.5%)	69 (35.6%)	9 (4.6%)
Agitated	196	126 (64.3%)	10 (5.1%)	55 (28.1%)	5 (2.6%)
Apathetic	198	19 (9.6%)	33 (16.7%)	137 (69.2%)	9 (4.5%)

Note. N participants (%). Participants answered questions regarding observed changes in challenging behavior using a 7-point scale plus the option "don't know." The items on the 7-point scale were as follows: 1 = strong decrease, 2 = decrease, 3 = some decrease, 4 = no change, 5 = some increase, 6 = increase, and 7 = strong increase. This table presents percentages for decrease (options 1 to 3), no change (option 4), and increase (options 5 to 7). Participants were not obligated to answer these questions.

Most participants reported that changes in the different types of challenging behavior varied between residents without dementia, those with mild dementia, and those with advanced dementia (66% answered "yes," whereas 14% answered "no" [other participants answered "don't know"]). Responses to open-ended questions indicated that reductions in untargeted stimuli, especially in residents without dementia, led to understimulation, agitation, and increased mood problems. On the other hand, reductions in untargeted stimuli were reported to be beneficial for residents with advanced dementia, resulting in decreased restlessness. Participants stressed the importance of achieving an adequate balance between stimuli and tranquility, tailored to the individual, regardless of whether the individual had a dementia diagnosis.

> *Psychologist: People with advanced dementia benefited from the calmer living environment and the fact that this was more manageable.*

> *Elderly care physician: For people without dementia, I expect more gloom and apathy; people with mild dementia also realize what is happening, so I expect the same from them. In advanced dementia, there is less awareness, and especially, due to controlled stimuli, less agitation.*

Our analysis of the open-ended questions also suggests that apathetic behavior increased in all resident groups. In particular, participants reported that residents with

agitated and psychotic behavior could benefit from strategies that limit untargeted stimuli, while residents with depressed or apathetic behavior may experience negative consequences from the use of such strategies.

Strategies

Participants indicated that they would like to continue using various strategies for reducing untargeted stimuli in the future (see **Table 3**). Specifically, 89% of participants responded positively to the idea of limiting the use of corridors adjacent to residents' rooms by suppliers and staff, while 78% responded positively to the idea of creating low-stimulation environments (i.e., environments with a low level of stimuli). Responses to open-ended questions indicate that participants especially endorse using these strategies with residents who have advanced dementia.

> *Activity therapist: In the case of dementia, we should offer major activities in a room located elsewhere in the nursing home. All the picking up and dropping off by employees and volunteers causes a lot of commotion.*

Table 3. Opinions about whether to continue using various strategies for reducing untargeted stimuli in the future.

	N	Yes	No	Don't know
Creation of low-stimulation environments	189	148 (78.3%)	29 (15.3%)	12 (6.3%)
Limiting the use of corridors adjacent to residents' rooms by suppliers and staff	188	167 (88.8%)	13 (6.9%)	8 (4.3%)
Performing care actions in the room of the resident (instead of in a communal area)	188	121 (64.4%)	39 (20.7%)	28 (14.9%)
Not allowing visitors in communal areas anymore	189	105 (55.6%)	67 (35.4%)	17 (9.0%)
Setting visiting hours	189	59 (31.2%)	113 (59.8%)	17 (9.0%)
Regulation of times that suppliers are present in care units	185	142 (76.8%)	20 (10.8%)	23 (12.4%)

Note. N participants (%). Participants were not obligated to answer these questions.

Opinions were divided over whether visitors should be banned from the living room (56% answered "yes," while 35% answered "no") and whether visiting hours should be adopted (31% responded "yes," while 60% responded "no"). Several participants believed these strategies may have added value for residents with advanced dementia but may result in a negative effect in residents without dementia. Too much walking in and out was regarded as disruptive, especially for residents with advanced dementia. Participants' responses to open-ended questions suggested that, in general, fixed visiting hours are not desirable and that instead, there is more value in individualized arrangements or rules of conduct in the living rooms. For example, it was mentioned

that such measures might stipulate the number of visitors, suitable visiting times, and the manner of interaction with other residents.

> *Psychologist: I am not in favor of set visiting hours, but I am in favor of establishing specific times when visits are not welcome, such as meal times, early mornings or later in the evenings.*

> *Activity therapist: Setting visiting hours is not exactly person-oriented, but family members continually walking in and out can be very disruptive.*

Most participants (64%) responded positively to the suggestion to perform care actions, such as setting up a wheelchair in the resident's room and coordination between caregivers, in a private area, instead of in communal areas. Additional ideas for limiting untargeted stimuli in daily care included being alert to one's own and others' disturbing stimuli (e.g., wearing shoes with noisy soles or heels, talking loudly, walking unnecessarily) and limiting undesirable background noises (e.g., squeaky doors or cart wheels, loudly ringing telephones). On the other hand, participants stressed that some level of (untargeted) stimulation is desirable for many residents. It was noted that creating different sociotherapeutic environments indoors with different levels of stimulation (e.g., quiet/low stimulation, social/lively, or sensory stimulation) may be an appropriate way to meet the conflicting wishes and needs of individual residents. Organizing activities in separate rooms or creating rooms where residents can retreat with their loved ones may also help to create a person-oriented approach to satisfying the various differing needs of residents.

> *Psychologist: Oil squeaky cart doors and wheels, install sound-absorbing carpeting, and no dishwasher in the living room (a lot of noise from clattering plates and running the dishwasher).*

> *Psychologist: Organize well-being activities at the care unit in such a way that residents are not always being picked up and dropped off from the living room. An activity itself, on the other hand, does provide stimuli in the living room, but these are desirable.*

> *Elderly care physician: Furnishings (soothing colors, no busy patterns / frills). The basis of the environment should be low-stimulus, so that you can add stimuli depending on the group, as we already do: soft-soled shoes, no music while eating (or sometimes music, but only if the whole group finds having music more pleasant). Reasoning in terms music/ activity should be based on the group that is there. Also important is for employees not to talk to residents about other residents, not to speak loudly, and not to chit-chat between themselves without also involving any residents in their vicinity. It's their living room; you wouldn't want this sort of thing happening in your home either.*

In total, 154 out of 181 participants (85%) saw a role for themselves or their colleagues in continuing to limit untargeted stimuli. Respondents suggested the following as possible strategies for limiting untargeted stimuli: ensuring that members of the care team are aware of the need to limit untargeted stimuli; providing support for coaching staff and interventions; including details in the resident's treatment plan that outline the types of untargeted stimuli to avoid; and, where possible, limiting one's own unintentional disruptive stimuli. Participants pointed to psychologists and occupational therapists as staff members who could play an important advisory or coaching role in reducing untargeted stimuli.

> *Psychologist: Make colleagues aware of how to limit these environmental stimuli. Consider providing a bit of coaching with regard to developing self-awareness.*

Targeted stimuli

A significant number of participants indicated that they would like to continue providing adjusted activities in the future (see **Table 4**). They were particularly positive about the use of small-scale activities (97% endorsed this strategy) and person-oriented activities (97% endorsed this strategy). Responses to open-ended questions emphasized the importance of encouraging social interaction and offering engaging stimuli, a strategy that can also involve simple, small-scale activities such as chatting or having a cup of coffee.

Table 4. Participant opinions about whether to continue specific adjustments to activities or new initiatives.

	N	Yes	No	Don't know
(More) small-scale activities / activities in smaller groups	175	170 (97.1%)	4 (2.3%)	1 (0.6%)
(More) activities in the living room	174	126 (72.4%)	32 (18.4%)	16 (9.2%)
(More) individual, person-oriented activities	174	168 (96.6%)	1 (0.6%)	5 (2.9%)
Attune to individual to provide more or fewer activities	175	158 (90.3%)	6 (3.4%)	11 (6.3%)
(Spontaneous) activities outside	174	153 (87.9%)	9 (5.2%)	12 (6.9%)
(Spontaneous) activities in the shared spaces	173	84 (48.6%)	64 (37.0%)	25 (14.5%)
Digital activities (e.g., online exercise program, virtual excursion, online bingo)	174	94 (54.0%)	56 (32.2%)	24 (13.8%)
Social robots or robot cuddly toys	175	111 (63.4%)	33 (18.9%)	31 (17.7%)

Note. N participants (%). Participants were not obligated to answer these questions.

> *Activity therapist: Activities offered in small groups have a calming effect and give clients confidence—they dare to engage more.*

Activity therapist: It's about the little things—no need to celebrate with a carnival every day. It is about the sense of well-being that you get from the way the curtains are opened and the breakfast is presented. Getting back to basics is what's important in life. Look more at individual needs.

Opinions were divided over the benefits of organizing (spontaneous) activities in the shared spaces (49% responded "yes," while 37% responded "no") and digital activities (54% answered "yes," while 32% answered "no"). With regard to digital activities, participants responded to the open-ended questions that such activities seem less suitable for residents with dementia. However, cuddly robot toys were thought to induce a positive effect, especially in people with advanced dementia. Participants regarded both digital and in-person activities as valuable for residents without dementia.

Activity therapist: We can let residents do more with computers, etc. It is not the case that only people under the age of 75 enjoy playing interactive games or getting in touch with others. There is still much to gain here.

Discussion

This survey study has shown that changes in stimuli brought about by the COVID-19 restrictions affected specific NH resident groups differently. While residents with advanced dementia and those with psychotic and agitated behavior seemed to benefit from the reduction of untargeted stimuli, residents without dementia and those with depressive and apathetic behavior may have been negatively affected when such stimuli were minimized. Various strategies to reduce untargeted stimuli that may be experienced as disruptive by residents or to adapt targeted stimuli seem to be beneficial, and this may continue to be the case in a post-pandemic era. On the other hand, some participants stressed that, for many residents, some amount of untargeted stimulation can be desirable.

These results confirmed and provided insight into previous findings with contradictory effects of the COVID-19 restrictions on challenging behavior in specific resident groups (Benzinger et al., 2021; Leontjevas et al., 2020; Van der Roest et al., 2020). These contradictions might be explained by a heterogeneous NH population. The COVID-19 measures may have had beneficial effects for some groups and undesirable effects for others. The results are consistent with previous findings about untargeted stimuli being especially disturbing for residents with dementia and eliciting agitated behavior (Garcia et al., 2012; Janus et al., 2020; Lawton & Nahemow, 1973).

Our study suggests that consciously designing separate environments within the NH with different levels of stimulation (e.g., quiet/low stimulation, social/lively, or sensory

stimulation) may be an appropriate way of meeting the opposing needs of residents (Calkins, 2018; Lawton, 2001; Marquardt et al., 2014). Providing activities in small groups or in separate rooms may also be helpful in meeting the wishes and needs of individual residents. Although private bedrooms are generally available for most Dutch NH residents, providing separate living rooms where residents can retreat with their loved ones may also be desirable. In line with previous research (Möhler et al., 2018; Travers et al., 2016), our study highlights the value of meaningful and personally tailored activities to improving challenging behavior in NH care.

In general, our findings suggest the importance of paying attention to sensory information processing by individual residents and to different types of stimuli present within NHs. While sensory stimulation is important for NH residents (Prins et al., 2020; Smith & D'Amico, 2020; Zimmerman et al., 2013), its effect on behavior may depend on the type of stimuli (targeted or untargeted at the resident) and characteristics of individual residents (e.g., ability to process sensory input). However, to date, little is known about the relation between sensory information processing and challenging behavior of NH residents. Based on our findings, particular attention should be paid to this in future research.

Strengths and limitations

The COVID-19 pandemic provided a unique situation for studying the effect of changes in diverse stimuli on challenging behaviors in NH residents. These changes would normally not have occurred. However, some of the changes in stimuli that we identified, such as limiting undesirable background noises or being alert to one's own and others' disturbing stimuli, might easily be integrated in care as usual as they are not directly related to the COVID-19 situation. Therefore, the findings can be generalized to a post-pandemic era to a certain extent. Furthermore, by including perspectives of participants from multiple disciplines—activity therapists, psychologists, elderly care physicians, and nurse specialists—we were able to achieve a broad understanding of the topic from different vantage points.

However, this study has several limitations as well. Due to nursing staff's very high workload during the pandemic, we did not include them in the study. Residents themselves were also not included because of the ban on visitors in NHs. Although our aim was to learn from NH professionals' experiences, input from the residents themselves, as well as those directly involved in their daily care, might have shed more specific light on the potential impacts of stimuli changes on residents.

Also, this study only analyzed perceptions of staff, without assessing actual effects of the changes in stimuli on challenging behavior. Although responses to both the closed and open-ended questions offered insight into the possible effects of these changes, as well as participants' perceptions regarding the success of certain

strategies, an objective measure for (changes in) challenging behavior in residents was not administered. It is also not clear to what extent changes in care actions by health care professionals in response to COVID-19 restrictions (e.g., offering more individual attention to residents to mitigate negative effects of the restrictions) or being more aware of residents' behaviors, affected the perceptions of professionals. These actions may have also influenced residents' challenging behavior, directly or indirectly.

Finally, we did not explicitly ask participants to verify the stage of dementia. We also did not ask participants to comment on possible effects of changes in stimuli on individual residents, but on the effect on groups of residents as a whole. These limitations also apply to the classification of challenging behavior. As our results may reflect opinions of professionals rather than objective assessments and are based on estimated effects on resident groups rather than individual residents, the results need to be interpreted with caution. Nonetheless, we believe the participants, who are all nursing home healthcare professionals, were able to provide their best informed opinion.

Conclusions

This study provided insight into the observed effects of changes in stimuli on challenging behavior. Furthermore, potential strategies for managing challenging behavior in NHs were suggested in our study that may also be of use after the COVID-19 pandemic. The effects of COVID-19 restrictions in NHs highlight the importance of achieving a good balance between stimuli and tranquility, tailored to the level of stimulus processing and needs of individual residents. In addition, our study underlined challenges in balancing between individual needs and group home care. In general, stimuli in NHs seem to affect individual residents differently. Our findings suggest that the type of stimuli commonly present in NHs needs to be considered when analyzing and treating challenging behavior in practice. Different stimuli can have different effects on particular resident groups and specific types of challenging behaviors.

The study also showed that the pandemic may have served as a catalyst for new initiatives in NH care. To that end, new strategies and initiatives may prove to be beneficial after the pandemic. These findings can inform future interventions for successfully managing challenging behavior in NHs.

Nevertheless, more research is needed into the best way of meeting residents' individual wishes and needs. In the post pandemic era, experimental studies that assess the effects of and experiences with suggested strategies and initiatives more thoroughly would be welcome. Furthermore, future research should include nursing staff as well as residents, so that different perspectives can be compared.

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PART 2

Measuring mood-improving behaviors and caregivers' implicit associations with these behaviors

Chapter 5

Mapping mood-improving behaviors in nursing homes: development and evaluation of the Actions to Improve Mood inventories

[submitted for publication]

Inge A.H. Knippenberg
Ruslan Leontjevas
Ine J.N. Declercq
Patricia De Vriendt
Anke Persoon
Peter Verboon
Jacques J.D.M. van Lankveld
Debby L. Gerritsen

Abstract

Background: Nursing home residents and professional caregivers may engage in behaviors that, although not considered formal treatments for depression, can improve residents' mood. To support future studies aiming to explore ways to complement formal depression care in nursing homes, reliable and valid instruments for measuring these informal mood-improving behaviors are needed.

Methods: This project developed and evaluated inventories to measure mood-improving behaviors in Dutch and Belgian nursing homes. Study 1 followed an iterative mixed-methods approach to develop two inventories: the Actions to Improve Mood by Residents (AIM-R) and the Actions to Improve Mood by Caregivers (AIM-C), and to assess their content validity (N = 31 residents; N = 35 caregivers, respectively). Study 2 evaluated test-retest agreement (N = 206; N = 125) and inter-rater agreement (AIM-C: N = 81) using a test-retest design. Study 3 explored the inventories' practical application through semi-structured interviews (N = 12; N = 6). Data were analyzed through thematic analysis, content validity indices, and Gwet's AC2 agreement coefficients.

Results: Both inventories demonstrated acceptable content validity, with moderate to very good test-retest agreement. Inter-rater agreement for most items was classified as "fair." Thematic analysis suggested that using the inventories increased awareness of mood-improving behaviors and contributed to better knowledge about residents. Challenges regarding usability and interpretability were identified, along with suggestions for refinement.

Conclusions: The inventories appear to adequately capture mood-improving behaviors and show consistency over time. Nevertheless, their usability and interpretability could benefit from further refinement. Pending additional research, these inventories hold promise for assessing mood-improving behaviors in nursing homes, aiding future efforts to explore new ways to enhance depression care alongside traditional treatments.

Background

Depressive symptoms are common among nursing home residents, affecting approximately 46% of those with dementia and around 23% of those without dementia (Van Asch et al., 2013). Among residents without dementia, the prevalence of major depressive disorder is estimated to be about 19% (Fornaro et al., 2020). Since depression is associated with reduced quality of life (Sivertsen et al., 2015) and increased mortality (Gilman et al., 2017; Kane et al., 2010), effective approaches for preventing and treating depression in nursing home residents are important.

Depression interventions can be broadly categorized into pharmacological and non-pharmacological treatment approaches. Despite their common use, pharmacological interventions have shown limited effects on nursing home residents (Boyce et al., 2012; Declercq et al., 2024; Simning & Simons, 2017). A systematic review and meta-analysis by Nelson and Devanand (2011) also indicated insufficient efficacy of antidepressants in people with dementia. Additionally, antidepressants are often associated with poor treatment adherence and negative side effects (Brown et al., 2002; Hartikainen et al., 2007).

In contrast, non-pharmacological treatments, including psychotherapeutic (e.g., cognitive behavioral therapy and reminiscence therapy) and psychosocial interventions (e.g., exercise programs and interventions targeting social isolation), have demonstrated effectiveness in reducing depressive symptoms, especially those that incorporate active behavioral components, with fewer negative side effects compared to pharmacological approaches (Burley et al., 2022; Cuijpers et al., 2021; Cuijpers et al., 2007; Declercq et al., 2024; Gramaglia et al., 2021; Noone et al., 2019; Simning & Simons, 2017). However, older adults with limited cognitive capacity might encounter difficulties with psychotherapeutic interventions (Rostamzadeh et al., 2022; Tonga et al., 2016), indicating a need for additional approaches.

One promising approach involves everyday behaviors by residents and caregivers that, while not considered part of formal treatment, can improve residents' mood. For example, professional caregivers using humor or residents initiating conversations have been shown to contribute to improved mood (Haugan et al., 2013; Knippenberg et al., 2021; Meeks & Looney, 2011). Because these behaviors seem relatively easy to integrate into daily routines, they warrant further exploration. Gaining insight into the use and impact of these behaviors within nursing homes is important for enhancing resident care. This requires the development of measurement instruments with acceptable psychometric properties to accurately assess these behaviors, guiding future research and aiding in the development or refinement of interventions.

These instruments need to comprehensively assess behaviors that may improve the mood of nursing home residents and are easy for residents or professional staff to engage in. This expands upon existing instruments, such as the Pleasant Events Schedule (Logsdon & Teri, 1997; Meeks et al., 2009), which focus solely on residents' engagement in pleasant activities. Moreover, instruments for mood-improving behaviors must accommodate the diversity of the resident population, considering varying degrees of physical and cognitive ability and different preferences regarding such behaviors. For example, some residents may prefer not to engage in certain behaviors themselves or may be unable to do so, but they might benefit from caregiver involvement during interactions. From a practical point of view, the instruments should also facilitate relevant suggestions for improvements in daily care. To the best of our knowledge, no such instruments currently exist.

Therefore, the aims of this project were 1) to develop inventories for mapping mood-improving behaviors in nursing home residents meeting the aforementioned requirements; 2) to examine the content validity, test-retest and inter-rater agreement of these instruments; and 3) to explore experiences with applying the inventories in daily practice in terms of potential issues with psychometrics and usability. The development of such inventories could facilitate future studies to identify specific mood-improving behaviors that are most beneficial for residents, guiding personalized and more effective interventions that can be used to improve residents' mood in addition to formal treatment approaches.

General methods

In this section, we describe the methodological aspects that apply to all three studies within this project. Further details about the methods (i.e., procedure, materials, and analysis) as well as the results and subsequent considerations are described per study.

Construct and measurement model

In this project, we define "mood-improving behaviors" as a broad spectrum of actions aimed at enhancing the mood of nursing home residents. These behaviors encompass a range of actions exhibited by both residents themselves and professional caregivers. A formative measurement model was chosen for this construct, as this type of measurement model is suitable when the construct is considered to be formed by its indicators (Fried, 2017). Formative models allow for a flexible approach, as they can represent constructs that are conceptually defined as a combination of diverse, potentially unrelated indicators.

Study design and setting

We conducted three consecutive studies in nursing homes in both the Netherlands and Flanders (the Dutch-speaking part of Belgium). Relevant findings from studies 1 and 2 were considered in the subsequent studies.

Study 1 followed an iterative, mixed-methods approach to develop two inventories, the Actions to Improve Mood by Residents (AIM-R) and the Actions to Improve Mood by Caregivers (AIM-C), for mapping mood-improving behaviors employed by residents themselves and professional nursing home caregivers, respectively. The final versions of these inventories were tested for content validity. In Study 2, the test-retest agreement and inter-rater agreement of the inventories were assessed using a repeated-measures design with two time points. Both inventories were completed twice by the same participants approximately two weeks apart (T0 and T1), which has been suggested as an appropriate time interval to assess test-retest agreement (Terwee et al., 2007). To test the inter-rater agreement of the AIM-C, two caregivers were invited to complete this inventory for the same resident. In Study 3, a qualitative approach involving semi-structured interviews with stakeholders was employed to explore their experiences in using the inventories in daily practice, specifically focusing on potential issues with psychometrics and usability.

General characteristics of participants in all studies

The research team invited nursing home residents and professional caregivers to participate in one or more studies. The inclusion criteria for residents were the ability to provide informed consent and the willingness and capacity to a) verbally communicate their opinion about the inventories (studies 1 and 3), or b) fill out questionnaires together with one of the researchers (study 2). Residents from short-stay units (i.e., rehabilitation care units) were excluded. We aimed to include residents with and without dementia, as well as those with and without depression, making the study inclusive of various resident profiles. The general criterion for caregivers was working primarily as employees providing direct care to residents (e.g., registered nurses and certified nurse assistants). To participate in study 2, caregivers needed to be significantly involved in the care of one or more participating residents.

In addition to residents and nurses, other professionals were involved in the studies. In study 1, the research team members, with expertise in psychology, gerontology, nursing sciences, and psychometrics, contributed to developing and refining the inventories. In study 2, nursing home staff members (e.g., psychologist, physician, and registered nurse) were consulted to provide additional information about the participating residents (e.g., level of cognitive functioning). For study 3, alongside input from residents and caregivers, we also gathered feedback from the interviewers

who conducted the in-person interviews with residents in study 2, focusing on their experiences with administering the AIM-R.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki (World Medical Association, 2013) and complied with Dutch and Belgian laws. Ethical approval for the study was obtained from the legally designated ethics committees in both countries (CMO Radboudumc, reference number: 2021-11047 in the Netherlands; CME VUB, reference numbers: EC-2021-277 and EC-2021-432 in Belgium). Prior to participation, all participants were informed about the study and provided written informed consent.

Study 1: Development process and content validity

Methods

Procedure and materials

Development process. The initial versions of the AIM-R and AIM-C were based on lists of informal mood-improving behaviors in nursing homes identified in two previously conducted group concept mapping studies (Knippenberg et al., 2022). These studies used a bottom-up method to identify, prioritize, and cluster mood-improving behaviors by nursing home residents themselves and by others important in residents' lives.

Taking into account the intended principles formulated in the introduction, members of the research team critically considered and discussed these (clusters of) behaviors, grouping them into initial themes (e.g., "exercise" and "music"). The research team also formulated initial items with response categories, which were further refined through expert consultations. Next, preliminary versions of the AIM-R and AIM-C were piloted, focusing on layout and content (i.e., relevance, applicability of the actions in daily practice, comprehensiveness, and comprehensibility [i.e., understandability of the instructions, examples, items, and response options]). For the AIM-R, two skilled interviewers (IK and ID) conducted semi-structured interviews with residents based on cognitive interviewing techniques (Beatty & Willis, 2007). In these interviews, parts of the AIM-R were presented to residents. The interviews were supported by a pre-defined interview guide with think-aloud and verbal probing procedures. Examples of prompt questions included "please tell me your thoughts while reading/hearing this question," and "what kinds of situations were you thinking about in coming up with this answer?" Open-ended and closed questions were included in the interviews. During the interviews, the interviewers took notes on their observations and residents' comments. Feedback on the AIM-C inventory was solicited from caregivers via an online survey tool (LimeSurvey Project Team and Schmitz, 2015) employing questions similar to those posed to the residents.

Throughout this iterative procedure, the research team discussed the findings and made adjustments to the inventories as needed. New versions were then presented to additional participants (residents and caregivers) until no further improvements were identified, and the inventories were considered acceptable.

Content validity. After the inventories were refined and the most appropriate versions were chosen, the AIM-R and AIM-C were assessed for content validity using a structured in-person interview with residents (for the AIM-R) and an online survey (LimeSurvey Project Team and Schmitz, 2015) for caregivers (for the AIM-C). To test content validity, participants were asked about the relevance ("not relevant," "somewhat relevant," "quite relevant," or "highly relevant") (Davis, 1992) of each theme as to residents' mood.

Analysis

To analyze the qualitative data in the development process of the AIM-R and AIM-C (i.e., responses to the open-ended questions on the survey and interviews, and additional notes from the interviews with residents), one researcher (IK) performed thematic analyses (Braun & Clarke, 2006) in ATLAS.ti 9 (ATLAS.ti Scientific Software Development GmbH, 2023). A second researcher (RL) checked the initial codes attached to the text segments, after which they were discussed between the two researchers until consensus was reached.

To assess the content validity of the final versions of the inventories, we calculated Content Validity Indices (CVI) in SPSS 27 (IBM Corporation., 2013) for each separate theme (item-level CVI [I-CVI]) (Yusoff, 2019). While an I-CVI can range between .00 and 1.00, an I-CVI of at least .78 is usually considered acceptable (Lynn, 1986). To reach consensus on the omission of a theme, the research team discussed the eligibility of themes that did not meet this cutoff score. The decisions were guided by the principles outlined in the introduction, while carefully considering the corresponding I-CVI level.

Results

Participants

During the iterative process, preliminary versions of the AIM-R and AIM-C were piloted with 34 residents (mean age, 81.8 years; SD, 7.4; range, 67–92) and 66 caregivers (mean age, 44.6 years; SD, 12.8; range, 21–68). Most participants were female (residents, N = 25 [73.5%]; caregivers, N = 61 [92.4%]) and lived in the Netherlands (residents, N = 22 [64.7%]; caregivers, N = 59 [89.4%]). Caregivers worked mainly as certified nurse assistants (N = 31 [47.0%]) or as registered nurses (N = 19 [43.9%]) and had a mean working experience of 14.2 years (SD, 12.9; range, 0–45). For the final versions of the inventories, 31 residents (23 of whom had already participated in the pilot with a preliminary version of the AIM-R) and 35 caregivers (22 of whom had provided feedback

on a preliminary version of the AIM-C) answered questions related to the content validity of the final versions of the inventories.

Development process

In our examination of informal antidepressant behaviors, we observed a broad range of actions in which individuals engage to improve residents' mood, supporting the appropriateness of a formative measurement model (Fried, 2017) for the construct of "mood-improving behaviors." Regarding the scope of the inventories, the AIM-R is aimed at actions performed by residents themselves, whereas the AIM-C is directed at actions performed by caregivers. As resident care often involves multiple caregivers, we expanded the scope of the AIM-C to include actions performed by several caregivers, not solely the person completing the inventory. As a result, the AIM-C inventory inquires about actions undertaken by both the persons completing the inventory and their colleagues.

In terms of content, we deliberately chose content thematic categories and their associated behaviors for both residents and caregivers. The primary focus was on identifying themes of caregiver and resident behaviors that contribute to improved mood. This approach recognizes that the inventories can encompass elements within or extending beyond formal interventions. Consequently, we have not omitted themes that could also involve formal interventions, such as physical activity. This inclusivity is due to caregivers potentially promoting resident engagement in these activities or residents independently participating in them. By adopting a comprehensive approach, we explored a broader spectrum of behaviors that have the potential to positively influence residents' mood.

Given the aim of offering practical guidance for specific enhancements, we included identical themes in both the AIM-C and AIM-R inventories. This should enable a direct comparison between residents' and caregivers' mood-improving behaviors, which might provide better insight into the actions needed from each group. This could also facilitate an understanding of the roles and responsibilities of both residents and caregivers in enhancing mood. By identifying shared themes, it may be possible to tailor interventions more effectively and foster a collaborative approach in promoting positive mood outcomes in residents.

Final versions and content validity

The final versions of the AIM-R and AIM-C (see **additional files 1 and 2**) covered 18 themes, with two items per theme. Examples of themes include "physical activity," "contact with others," and "music." Each theme contains a description (e.g., AIM-R: "Activities related to music. Think of making music or listening to it attentively") and examples of possible actions (e.g., AIM-R: "Listening to the radio, singing, playing an instrument, going to a concert, or any other music-focused activity"). The description

and examples are followed by two items: a question about the action's frequency (e.g., AIM-R: "concerning music-focused activities, how often do you do this in an average week?"; a 5-point scale ranging from "never" to "very often") and a question about the expected effect of the behavior on residents' mood (e.g., AIM-R: "if you do [or would do] this, does this make you feel happy?"; three response categories: "no," "yes, a bit happy," and "yes, very happy"). For the AIM-C, the descriptions, examples, and items about the action's frequency are directed at caregivers' actions, whereas the item about the expected effect was focused on residents' mood (i.e., AIM-C: "if you do [or would do] this, does this make the resident feel happy?").

The I-CVI for the themes was above .78 for all but one theme ("household activities," I-CVI = .73) of the AIM-R, and all but four themes of the AIM-C ("household activities," "stimulating the senses," "faith and meaning," and "doing something for someone else," I-CVI = .69 for the first and .71 for the latter three themes) (see **Table 1**).

Table 1. Content validity index of the themes of the AIM-R and AIM-C.

Theme	AIM-R, N = 31	AIM-C, N = 35
1. Physical activity	.90	1.00
2. Contact by touching	.90	1.00
3. Taking care of the appearance	.84	.91
4. Relaxation	.81	.94
5. Healthy living	.87	.89
6. Household activities	.73	.69
7. Creating something	.93	.97
8. Brain stimulation	.90	.94
9. Music	.93	1.00
10. Going out	.97	.89
11. Precious memories	.94	.91
12. Stimulating the senses	.90	.71
13. Contact with others	.93	1.00
14. Nature	.94	.89
15. Faith and meaning	.94	.71
16. Doing something for someone else	.90	.71
17. Security and warmth	.87	.94
18. Positive attitude	.93	.94

Note. AIM-R = Actions to Improve Mood by Residents, AIM-C = Actions to Improve Mood by Caregivers.

Considerations for Study 2

In study 1, the AIM-R and AIM-C inventories were developed and tested for their content validity. During the content validation process, we found that some themes had an I-CVI below the acceptable threshold. However, the team made a deliberate decision to retain these themes in the inventories for two reasons. First, despite certain themes falling short of the recommended standard of acceptable content validity in one inventory, they met the criterion in the other inventory. For instance, the themes "stimulating the senses," "faith and meaning," and "doing something for someone else" were deemed less relevant in the AIM-C, but demonstrated acceptable content validity in the AIM-R. This suggests that while the importance of actions within a theme may differ between residents and caregivers, the overall content validity of the theme remains intact. Second, even though some themes may have less general relevance for mood-improving behaviors, they may hold substantial importance for specific sub-populations of residents. For instance, the theme "stimulating the senses" may be particularly significant for residents with (severe) cognitive decline (van Weert et al., 2005), whereas being active in "household activities" may hold promise for those with or without mild cognitive decline (den Ouden et al., 2015; Liu et al., 2007). Given our aim of developing inclusive inventories that are also suitable for residents with cognitive decline, the research team decided against excluding any themes on the basis solely of their I-CVI levels.

In conclusion, despite observing variations in I-CVI levels, all 18 themes were retained in both inventories to ensure comprehensive coverage of mood-improving behaviors and to accommodate the diverse needs of nursing home residents. Including themes relevant to specific sub-populations aligns with our goal of developing practical and inclusive tools for assessing mood-improving behaviors in residents with varying physical and cognitive abilities.

Study 2: Test-retest and inter-rater agreement

Methods

Procedure and materials

In addition to demographic characteristics, residents were asked to answer the questions of the AIM-R in a structured in-person meeting with one of seven interviewers (two psychologists, one research employee, three master's students in psychology, and one master's student in gerontology; four interviewers living in the Netherlands, and the other three living in Belgium). For each participating resident, two caregivers were subsequently asked to complete the AIM-C individually with respect to actions that they or their colleagues perform for (a) specific resident(s), alongside answering questions about their demographic characteristics, either on paper or

online (LimeSurvey Project Team and Schmitz, 2015). Two weeks later, residents and caregivers completed the AIM inventories again. Caregivers completed the inventory again for the same resident(s) as during the baseline measurement.

Additional data about the participating residents were collected by asking a therapist (in most cases, a psychologist) or registered nurse to complete an online form (LimeSurvey Project Team and Schmitz, 2015). This form consisted of questions about the residents, including a) type of unit ("open" or "closed" and "medical-somatic care," "psychogeriatric care," "mental-physical multimorbidity care," or "mixed"), b) depression diagnosis ("yes," "no," or "don't know"), and c) stage of cognitive function using the Global Deterioration Scale (GDS) (Reisberg et al., 1982). All data were collected between February and December 2022.

Analysis

To assess the agreement between the two measurement points (test-retest agreement between T0 and T1) of the items of the AIM-R and AIM-C and the agreement between the two caregivers (inter-rater agreement at baseline) of the AIM-C items, Gwet's AC2 coefficients (Gwet, 2021) were calculated using the irrCAC R package (Gwet, 2019) in R (R Core team., 2022). Only responses within a time frame of 10 to 31 days between baseline and T1 were included in the assessment of test-retest agreement. Gwet's AC2 coefficient was chosen given its resilience to grey zones (i.e., areas in the data where agreement between raters is low or moderate) and variation in distributions (e.g., skewed distributions) (Quarfoot & Levine, 2016; Tran et al., 2020; Tran et al., 2021).

Weighting schemes ranging from .00 (full disagreement) to 1.00 (full agreement) were specified to the distance of disagreement within measurement points (test-retest) and between caregivers (inter-rater), where a higher score indicates a higher level of agreement. A linear weighting scheme was applied to the items regarding frequency. This means that an evenly spaced weight of .25 was applied to each distance of disagreement (e.g., a weight of .75 regarding a disagreement distance of one point on the 5-point scale, and a weight of .50 for a disagreement distance of two points). For the items regarding the expected effect on residents' mood (a 3-point scale), adapted weights were specified for the degree of disagreement. These weights considered any disagreement with the response option "no" (weight of .25 for disagreement with "yes, a bit happy" or weight of .00 for disagreement with "yes, very happy") to be more significant than a disagreement between the response options "yes, a bit happy" and "yes, very happy" (weight of .75).

To characterize the magnitude of the AC2 coefficients, we used Altman's benchmarking 5-point scale ranging from "poor" to "very good" (Altman, 1991). To calculate the probability that the coefficients would fall into each category, the agreement coefficient and its standard error were used. As recommended by Gwet (2021),

a cumulative probability above .95 was applied to determine the lowest expected agreement strength level.

In addition to analyses of the total sample, explorative subgroup analyses were performed. For both inventories, agreement outcomes were explored, broken down by country (the Netherlands or Belgium) and level of cognitive functioning (residents with no to mild cognitive decline [GDS score ≤ 3] and residents with moderate to severe cognitive decline [GDS score ≥ 4]).

Results

Participants

In total, 405 nursing home residents were invited to participate in study 2. At baseline, 273 residents (67.4% of the invited residents, mean age 82.4 years; SD, 9.3; median, 84.0; range, 47–102) from 30 nursing homes (16 of which are located in the Netherlands) completed the AIM-R, whereas 119 unique caregivers (mean age, 39.5 years; SD, 11.6; range, 22–65) filled out the AIM-C for at least one resident (see **Tables 2 and 3**). In total, the AIM-C was completed 268 times. For 187 residents (68.5%), at least one caregiver completed the AIM-C. Of those, the AIM-C was filled out by two caregivers for 81 residents (29.7% of the total participating residents). On average, a caregiver filled out the AIM-C for two residents (mode, 1; median, 1; range, 1–11). Additional resident data about the residence unit, depression diagnosis, and stage of cognitive functioning were provided by treatment staff members for 205 residents (75.1% of the total). At the two-week measurement, 209 AIM-R and 151 AIM-C inventories were completed, of which 206 AIM-R (75.5% of completed baseline inventories) and 125 AIM-C (46.6% of completed baseline inventories) administrations fell within the acceptable time frame of 10 to 31 days between baseline and follow up.

Table 2. Characteristics of residents for Study 2.

Characteristic	T0	T1 (2 weeks)
N	273	209
Gender, female, N (valid %) / male, N	172 (63) / 101	124 (59) / 85
Age, mean (SD) [range]	82.4 (9) [47-102]	82.4 (9) [47-102]
Country, the Netherlands, N (%) / Belgium, N	140 (51) / 133	123 (59) / 86
Educational attainment		
Low, N (%)	135 (50)	106 (51)
Medium, N (%)	91 (33)	71 (34)
High, N (%)	47 (17)	32 (15)

Table 2. Continued

Characteristic	T0	T1 (2 weeks)
Marital status		
Unmarried, N (%)	33 (12)	22 (11)
Married or partnered in a registered partnership, N (%)	55 (20)	44(21)
Widowed (after marriage or registered partnership), N (%)	150 (55)	115 (55)
Divorced (after marriage or registered partnership), N (%)	33 (12)	26 (12)
Missing, N (%)	2 (1)	2 (1)
Type of unit (A)		
Medical-somatic care, N (%)	80 (29)	75 (36)
Psychogeriatric care, N (%)	50 (18)	34 (16)
Mental-physical multimorbidity care, N (%)	25 (9)	18 (9)
Mixed, N (%)	118 (43)	82 (39)
Type of unit (B)		
Open, N (%)	187 (69)	149 (71)
Closed (code is unknown for resident), N (%)	59 (22)	39 (19)
Closed (code is known for resident), N (%)	27 (10)	21 (10)
Depression diagnosis		
Yes, N (%)	37 (14)	24 (12)
No, N (%)	160 (59)	135 (65)
Don't know, N (%)	8 (3)	5 (2)
Missing, N (%)	68 (25)	45 (22)
Global Deterioration Scale		
Stage 1: No cognitive decline, N (%)	42 (15)	37 (18)
Stage 2: Very mild cognitive decline, N (%)	69 (25)	55 (26)
Stage 3: Mild cognitive decline, N (%)	31 (11)	25 (12)
Stage 4: Moderate cognitive decline, N (%)	13 (5)	11 (5)
Stage 5: Moderately severe cognitive decline, N (%)	25 (9)	21 (10)
Stage 6: Severe cognitive decline, N (%)	25 (9)	15 (7)
Stage 7: Very severe cognitive decline, N (%)	0 (0)	0 (0)
Missing, N (%)	68 (25)	45 (22)

Table 3. Characteristics of professional caregivers for Study 2.

Characteristic	T0	T1 (2 weeks)
N	119	59
Gender, female, N (valid %) / male, N	108 (91) / 9	52 (88) / 7
Age, mean (SD) [range]	39.5 (12) [22-65]	39.2 (12) [22-65]
Country, the Netherlands, N (%) / Belgium, N	52 (44) / 67	32 (54) / 27
Educational attainment		
Low, N (%)	31 (26)	12 (20)
Medium, N (%)	64 (54)	31 (53)
High, N (%)	24 (20)	16 (27)
Type of health care provider		
Registered nurse, N (%)	33 (28)	19 (32)
Certified nurse assistant, N (%)	74 (62)	34 (58)
Nurse assistant / nurse aide, N (%)	2 (2)	1 (2)
Other, N (%)	7 (6)	5 (8)
Missing, N (%)	3 (3)	0 (0)
Years of working experience, mean (SD) [range]	10.9 (10) [0-44]	11.6 (11) [1-44]
Frequency of involvement in the care of residents with depression		
Never, N (%)	1 (1)	0 (0)
Occasionally, N (%)	28 (24)	14 (24)
Regularly, N (%)	57 (48)	31 (53)
Often, N (%)	23 (19)	8 (14)
Very often, N (%)	8 (7)	6 (10)
Missing, N (%)	2 (2)	0 (0)

Note. The characteristics of unique caregivers are provided.

Test-retest and inter-rater agreement

For the test-retest agreement in the total sample, the AC2 coefficients ranged from .55 to .87 for the AIM-R, and from .60 to .86 for the AIM-C inventory (see **Table 4**). For both inventories, the classification of the agreement strength ranged from "moderate" to "very good," where most items were characterized as "good" (23 out of 36 items for the AIM-R and 24 out of 36 items for the AIM-C). Although differences between subgroups were not statistically tested, there seemed to be slightly better test-retest agreement for the inventories administered in the Netherlands (where most items of both inventories were characterized as "good") than for those administered in Belgium (where most items were classified as "moderate" or "good" for the AIM-R and as "fair" or "moderate" for the AIM-C) (see **additional file 3**). In general, similar levels of agreement were found when the inventories were completed for residents with no to mild cognitive decline compared with residents with moderate to severe cognitive decline (i.e., for both subgroups, the agreement levels of most items of the AIM-R were classified as "good," whereas most items of the AIM-C were categorized as "moderate" or "good").

For the inter-rater agreement of the AIM-C, the AC2 coefficients ranged from .21 to .76 for the total sample, with the lowest expected levels of agreement strength ranging from "poor" (5 items) to "good" (1 item) (see **Table 5**). The most frequent classification of the agreement strength was "fair" (22 out of 36 items). There seemed to be better agreement when caregivers completed the inventories for residents with no to mild cognitive decline (the most frequent item coefficients were classified as "fair" [18 items] or "moderate" [13 items]) than when inventories were completed for residents with moderate to severe cognitive decline (the most common level of agreement was "poor" [23 items]) (see **additional file 4**). Furthermore, comparable levels of inter-rater agreement for the AIM-C items were found among caregivers in the Netherlands and Belgium.

Table 4. Agreement statistics for test-retest agreement of the AIM-R and AIM-C.

	AIM-R					AIM-C				
Theme and item	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]
1. Physical activity										
Frequency	202	86.3	19 26 29 12 37	.67 [.60;.74]	Good	125	84.8	14 17 18 13 4	.64 [.57;.72]	Moderate
Expected effect	199	86.9	28 47 68	.72 [.64;.80]	Good	123	81.5	17 37 27	.60 [.48;.73]	Moderate
2. Contact by touching										
Frequency	193	85.1	35 34 21 10 11	.65 [.58;.72]	Moderate	125	87.4	15 32 8 8 2	.73 [.67;.79]	Good
Expected effect	193	88.7	27 39 84	.77 [.69;.85]	Good	119	84.9	12 46 27	.69 [.59;.80]	Good
3. Taking care of the appearance										
Frequency	199	87.8	15 55 26 8 19	.72 [.66;.78]	Good	124	86.3	11 16 21 14 10	.67 [.59;.75]	Good
Expected effect	199	88.8	33 45 76	.76 [.68;.84]	Good	122	87.3	11 40 41	.74 [.64;.84]	Good
4. Relaxation										
Frequency	189	83.5	62 12 9 5 21	.63 [.55;.71]	Moderate	125	86.8	40 16 11 5 4	.72 [.64;.80]	Good
Expected effect	189	84.9	62 37 36	.66 [.57;.76]	Moderate	114	83.3	30 43 9	.67 [.56;.78]	Moderate
5. Healthy living										
Frequency	187	85.7	15 11 11 11 61	.67 [.59;.75]	Good	123	84.3	11 19 18 11 4	.64 [.56;.72]	Moderate
Expected effect	187	83.7	36 54 36	.64 [.55;.74]	Moderate	120	83.3	18 53 9	.69 [.58;.79]	Good
6. Household activities										
Frequency	197	89.6	97 21 11 3 8	.80 [.74;.86]	Good	124	88.3	52 16 5 4 2	.77 [.70;.84]	Good
Expected effect	194	86.3	69 46 27	.70 [.62;.79]	Good	113	84.5	58 20 6	.72 [.61;.83]	Good
7. Creating something										
Frequency	198	92.3	90 30 10 4 10	.85 [.80;.89]	Very good	125	87.0	27 19 12 12 1	.70 [.63;.77]	Good
Expected effect	186	87.5	56 29 59	.73 [.64;.81]	Good	117	87.6	29 35 25	.73 [.63;.83]	Good

Table 4. Continued

	AIM-R					AIM-C				
Theme and item	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]
8. Brain stimulation										
Frequency	199	84.2	11 5 6 10 79	.67 [.59;.75]	Good	125	86.0	21 16 18 10 4	.67 [.60;.75]	Good
Expected effect	199	86.6	15 39 84	.74 [.66;.82]	Good	121	86.6	22 46 20	.72 [.63;.82]	Good
9. Music										
Frequency	198	86.0	26 24 18 15 39	.66 [.58;.73]	Moderate	124	85.1	23 16 18 6 2	.66 [.58;.73]	Moderate
Expected effect	201	91.3	22 31 110	.84 [.78;.90]	Good	118	84.7	20 35 28	.67 [.55;.79]	Moderate
10. Going out										
Frequency	194	87.8	27 55 18 4 9	.74 [.69;.79]	Good	123	90.0	28 33 16 8 1	.78 [.70;.85]	Good
Expected effect	194	87.9	8 29 111	.79 [.72;.87]	Good	120	91.5	14 28 54	.83 [.75;.91]	Good
11. Precious memories										
Frequency	198	84.3	17 34 22 7 18	.63 [.57;.70]	Moderate	125	85.8	5 28 23 11 0	.70 [.63;.77]	Good
Expected effect	189	87.0	26 43 65	.73 [.65;.81]	Good	123	91.7	3 50 40	.85 [.79;.91]	Good
12. Stimulating the senses										
Frequency	173	85.7	81 17 2 1 7	.73 [.66;.81]	Good	125	90.4	65 17 3 1 1	.84 [.78;.90]	Good
Expected effect	163	84.4	61 28 28	.66 [.56;.76]	Moderate	113	86.7	59 27 4	.77 [.67;.86]	Good
13. Contact with others										
Frequency	194	84.4	4 19 15 12 52	.64 [.58;.71]	Moderate	125	84.8	6 15 22 20 2	.64 [.56;.72]	Moderate
Expected effect	193	92.1	6 36 115	.87 [.82;.92]	Very good	122	85.2	8 34 42	.70 [.60;.81]	Good
14. Nature										
Frequency	196	83.9	16 33 17 13 25	.61 [.54;.68]	Moderate	125	86.4	37 16 10 6 0	.71 [.64;.78]	Good
Expected effect	198	89.8	9 37 104	.82 [.76;.88]	Good	117	84.0	31 26 26	.64 [.52;.76]	Moderate

Table 4. Continued

	AIM-R					AIM-C				
Theme and item	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]
15. Faith and meaning										
Frequency	189	91.1	66 27 14 3 33	.80 [.74;.86]	Good	124	90.3	44 33 5 2 2	.82 [.76;.88]	Good
Expected effect	183	89.6	63 42 36	.77 [.70;.84]	Good	117	82.5	52 19 11	.66 [.54;.77]	Moderate
16. Doing something for someone else										
Frequency	188	85.8	60 17 12 7 16	.68 [.60;.75]	Good	125	89.4	52 19 2 9 2	.79 [.72;.86]	Good
Expected effect	189	86.4	33 32 68	.71 [.63;.79]	Good	115	84.1	46 26 12	.68 [.56;.79]	Moderate
17. Security and warmth										
Frequency	173	84.8	21 28 21 10 14	.64 [.57;.71]	Moderate	125	85.4	12 31 11 10 5	.67 [.59;.75]	Good
Expected effect	178	89.7	13 40 76	.80 [.74;.87]	Good	121	82.9	11 38 33	.64 [.53;.76]	Moderate
18. Positive attitude										
Frequency	177	80.9	7 14 15 12 40	.55 [.47;.64]	Moderate	125	86.2	1 6 19 31 14	.70 [.63;.78]	Good
Expected effect	181	89.2	10 38 82	.80 [.74;.87]	Good	124	91.9	1 39 50	.86 [.81;.91]	Very good

Note. AIM-R = Actions to Improve Mood by Residents, AIM-C = Actions to Improve Mood by Caregivers, N = Valid number of participants, % Obs = Percentage observed, CI = Confidence Interval.

[a]The agreement diagonal is the part of the contingency table where raters agree on the same categories.

[b]Altman's benchmarking 5-point scale ranging from "poor" to "very good" was used to interpret the magnitude of the AC2 coefficients. A cumulative probability of above .95 was applied to determine the lowest expected agreement level.

Table 5. Agreement statistics for inter-rater agreement of the AIM-C.

Theme and item	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]
1. Physical activity					
Frequency	81	74.4	6 9 12 3 1	.41 [.27;.55]	Fair
Expected effect	80	76.6	6 17 17	.51 [.35;.67]	Fair
2. Contact by touching					
Frequency	81	75.9	8 10 4 5 1	.45 [.33;.57]	Fair
Expected effect	79	75.6	5 26 10	.51 [.34;.68]	Fair
3. Taking care of the appearance					
Frequency	81	71.9	1 6 7 5 2	.36 [.23;.48]	Fair
Expected effect	79	80.1	3 19 16	.61 [.48;.74]	Moderate
4. Relaxation					
Frequency	81	77.2	18 9 4 1 1	.49 [.36;.62]	Fair
Expected effect	74	66.6	8 25 2	.35 [.16;.55]	Poor
5. Healthy living					
Frequency	80	68.4	0 5 4 7 0	.27 [.13;.40]	Poor
Expected effect	77	69.2	5 22 3	.40 [.22;.57]	Fair
6. Household activities					
Frequency	80	79.7	28 5 2 0 0	.61 [.49;.73]	Moderate
Expected effect	73	70.9	28 10 3	.46 [.29;.63]	Fair
7. Creating something					
Frequency	81	77.8	13 7 7 5 1	.49 [.37;.62]	Fair
Expected effect	74	77.0	15 15 13	.49 [.31;.66]	Fair
8. Brain stimulation					
Frequency	80	76.3	9 6 13 4 0	.46 [.32;.59]	Fair
Expected effect	77	71.4	5 21 9	.42 [.24;.59]	Fair
9. Music					
Frequency	81	71.3	5 5 9 4 1	.32 [.18;.46]	Fair
Expected effect	75	67.7	2 18 14	.32 [.11;.53]	Poor
10. Going out					
Frequency	80	75.0	8 18 3 3 1	.43 [.28;.59]	Fair
Expected effect	77	73.7	0 16 21	.49 [.32;.67]	Fair
11. Precious memories					
Frequency	81	77.8	0 11 12 5 1	.52 [.42;.63]	Moderate
Expected effect	79	80.7	0 22 17	.64 [.52;.77]	Moderate

Table 5. Continued

Theme and item	N	% Obs	Agreement diagonal[a]	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[b]
12. Stimulating the senses					
Frequency	81	80.6	35 6 2 1 0	.66 [.54;.78]	Moderate
Expected effect	71	69.0	22 17 1	.41 [.23;.59]	Fair
13. Contact with others					
Frequency	81	72.8	2 7 8 5 1	.36 [.22;.50]	Fair
Expected effect	78	80.4	2 16 20	.63 [.50;.76]	Moderate
14. Nature					
Frequency	81	73.5	15 12 3 2 0	.43 [.28;.57]	Fair
Expected effect	73	64.4	7 11 12	.21 [.00;.42]	Poor
15. Faith and meaning					
Frequency	81	81.2	20 9 7 1 0	.63 [.52;.73]	Moderate
Expected effect	72	65.3	20 12 3	.32 [.14;.50]	Poor
16. Doing something for someone else					
Frequency	81	78.7	23 9 2 1 1	.56 [.43;.68]	Moderate
Expected effect	72	71.5	22 12 5	.40 [.22;.59]	Fair
17. Security and warmth					
Frequency	81	73.1	3 14 2 4 2	.38 [.23;.53]	Fair
Expected effect	76	71.7	2 17 14	.42 [.24;.61]	Fair
18. Positive attitude					
Frequency	81	73.8	0 1 6 8 4	.43 [.32;.54]	Fair
Expected effect	81	86.1	0 18 26	.76 [.68;.84]	Good

Note. AIM-C = Actions to Improve Mood by Caregivers, N = Valid number of participants, % Obs = Percentage observed, CI = Confidence Interval.
[a]The agreement diagonal is the part of the contingency table where raters agree on the same categories.
[b]Altman's benchmarking 5-point scale ranging from "poor" to "very good" was used to interpret the magnitude of the AC2 coefficients. A cumulative probability of above .95 was applied to determine the lowest expected agreement level.

Considerations for Study 3

Study 2 assessed the test-retest agreement and inter-rater agreement of the AIM-R and AIM-C. The items of both inventories appeared to have at least a moderate level of test-retest agreement for the total sample, which can be considered acceptable. For both inventories, the results suggested slightly worse test-retest agreement for the Belgian sub-sample than for the sub-sample from the Netherlands. Limited levels

of inter-rater agreement of AIM-C items were found for the total sample as well as for all the sub-samples, especially when used for residents with moderate to severe cognitive decline. To explore these findings further, we address these topics in study 3.

Study 3: Experiences with applying the inventories in daily practice

Methods

Procedure, materials, and analysis

A convenience sample of residents, caregivers, and interviewers was drawn from study 2. We used an interview guide with the following topics: a) general experiences when administering or completing the inventory, b) challenging aspects (including potential issues related to limited levels of agreement), and c) suggestions for improvements. When not mentioned spontaneously, in-depth questions about the inventories' content, questions, administration, and country-specific challenges were utilized. Thematic analysis (Braun & Clarke, 2006) was performed via ATLAS.ti 9 (ATLAS.ti Scientific Software Development GmbH, 2023), whereby the notes of all interviews were coded and discussed by two researchers (IK and RL).

Results

Participants

Five residents (mean age 78.3 years, 4 female) and six caregivers (mean age 40.1 years, all female) shared their opinions of positive and challenging aspects of using the AIM-R and AIM-C and advised on potential improvements. In addition, all seven interviewers from study 2 shared their opinions and suggestions for improvements regarding administering the AIM-R to residents.

Experiences with the application of the inventories in daily practice

Although both inventories were positively evaluated as very comprehensive, challenges were mentioned in terms of their usability and interpretability. The thematic analysis suggested that the interpretation of some themes of both inventories (e.g., "healthy living," "nature," and "contact with others") may not have been worded specifically enough. Furthermore, some of the provided examples seemed to cause confusion as they could also be associated with another similar theme. For example, "listening to relaxing music" (theme "relaxation") also seemed to be interpreted as the more general "listening to music" within the theme "music." Belgian interviewers also raised concerns about language issues in the inventories. Therefore, stakeholders recommended providing more specific descriptions of the themes that were evaluated as too broad and specification or reformulation of examples within these themes.

In general, both inventories were evaluated as applicable for residents with varying degrees of physical and cognitive ability. For the AIM-R, the interviewers suggested that the interpretability of some questions may have been challenging for residents with advanced dementia, mainly because of the large amount of text in the inventory. Nevertheless, according to the interviewers, querying most themes seemed possible for a considerable number of residents with cognitive decline. Therefore, the interviewers emphasized that it is not desirable or necessary to refrain from trying to administer this inventory to residents with dementia. Taking the time to clarify the themes and questions, or administering the inventory over multiple meetings, were considered helpful strategies for obtaining answers from this resident group. Although it was considered time-consuming, administering the inventory by means of an individual structured face-to-face interview was evaluated as an adequate method for gathering relevant information from residents. The descriptions of themes and examples within each theme were also regarded as helpful for usability and understandability. To further simplify the inventories, reducing the number of examples (max. 3 common example actions per theme) and simplifying the answer options were encouraged (i.e., “never,” “regularly,” and “often” for the action frequency; “yes” and “no” for the expected effect on residents’ mood). According to the participants, a more picture-oriented inventory could also be considered, as it may improve the usability and interpretability of the themes and questions for residents. As some themes (e.g., “household activities”) were deemed applicable only for some residents, stakeholders suggested an additional answer option: “the resident is unable to perform the behavior described.”

Although administering the AIM-R may have elicited negative associations (e.g., associations with unpleasant memories) in some residents, both the interviewers and the residents indicated that, in general, residents seemed to enjoy being asked about pleasant activities. It was stressed that for most residents, the inventory evoked positive associations (e.g., recent pleasant activities and fond memories). The interviewers indicated that the questions provided an opportunity for residents to discuss their experiences and preferences. In this way, it places more emphasis on residents’ agency. According to both residents and interviewers, the inventory may also raise awareness of possible mood-improving behaviors and may motivate residents to adopt them. The interviewers especially noted this in residents with no to limited cognitive decline.

For the AIM-C, caregivers indicated that they were not always aware of their colleagues’ activities, which complicated answering the questions. They suggested that this may have led to varying interpretations of the AIM-C items among caregivers. Caregivers also noted that some themes were less applicable for residents with advanced dementia than they were for other residents (e.g., “doing something for someone else”). They recommended the inclusion of comment fields as a means of incorporating relevant notes for practical guidance.

As a positive outcome of the AIM-C, caregivers mentioned that they had become more aware of mood-improving behaviors to employ in daily practice. They expected that the inventory may provide valuable information about caregivers’ actions and their effects, and that the AIM-C may be used as a valuable guide for getting to know residents.

General discussion

In three studies, two inventories for mapping mood-improving behaviors in nursing homes were developed and evaluated: the Actions to Improve Mood by Residents (AIM-R) and the Actions to Improve Mood by Caregivers (AIM-C). The AIM-R focuses on actions initiated by residents themselves, while the AIM-C focuses on actions initiated by caregivers. Both inventories encompass 18 similar themes, each with two items per theme (frequency and expected effect). Content validity assessment revealed that the themes reflected relevant aspects of mood-improving behaviors. Moderate to very good test-retest agreement was observed across the items of both inventories. However, only a few AIM-C items were classified as having at least moderate inter-rater agreement. Stakeholders’ experiences with the inventories highlighted both positive aspects, such as increased awareness of mood-improving behaviors, as well as and challenges, such as broad formulation of themes. Their constructive feedback provided valuable insights for further enhancing the usability and interpretability of the inventories.

While the themes in both inventories were meant to capture relevant aspects of mood-improving behaviors, a few themes did not meet the cutoff score for acceptable content validity, as recommended by Lynn (1986). However, the research team deliberately decided to retain these themes, as the behaviors might hold significance for specific individuals and because our aim was to develop inclusive inventories suitable for a large proportion of nursing home residents. Nevertheless, some themes may still be considered less relevant for some residents, suggesting that some content of the inventories may not be applicable for all nursing home residents. In line with this, the thematic analysis indicated that, while the inventories were evaluated as very comprehensive and, in general, applicable for residents with varying degrees of physical and cognitive ability, adding an additional answer option “not applicable” is advisable. Previous research has suggested that adding a non-applicability option could indeed improve the feasibility of inventories without affecting their content validity (Wessels & De Witte, 2003); however, it is important to note that adding such an option may also increase nonresponse rates (Kmetty & Stefkovics, 2022). For practical guidance, stakeholders have also advised the addition of comment fields. Future research may investigate the value of these suggestions.

The test-retest statistics imply adequate agreement over time for items of both inventories in the total sample and for both sub-samples broken down by the level of

residents' cognitive functioning. However, although not statistically tested because of the small sample sizes, the results suggest slightly lower test-retest agreement for inventory items within the Belgian sub-sample than within the Dutch sub-sample. This difference might be attributed to the limited number of Belgian participants involved in the development and pilot testing of the inventories. A related explanation may be that the level of content validity may differ between the countries. Although we were not able to compare content validity indices for both countries because of the limited sample size, feedback from stakeholders revealed that certain wording might be less applicable to Belgian participants, suggesting that even minor language differences can influence interpretability (Sousa & Rojjanasrirat, 2011). Future research may elucidate whether such differences exist, the extent to which they can explain the variations in terms of agreement over time, and how they could be reduced.

A notable challenge is the inter-rater agreement between caregivers on AIM-C items across all sub-samples, particularly for residents with moderate to severe cognitive decline. Stakeholder feedback suggested that the broad formulation and conceptual overlap of certain themes may have contributed to differing interpretations. According to caregivers, limited awareness of co-workers' actions may have further contributed to limited inter-rater agreement. This challenge, however, is not unique to the AIM-C; other inventories have also revealed limited inter-rater agreement among caregivers for resident observations, especially for residents with moderate to severe cognitive decline (Dichter et al., 2014; Knippenberg et al., 2023). Although the AIM-C inventory cannot be classified as an observer-reported measure, these challenges underline the importance of thoughtful utilization and interpretation of scores that go beyond self-reports. It is therefore recommended to involve at least two caregivers, allowing them to discuss and compare the scores when using the AIM-C. It is also advisable for caregivers to receive training on how to use the inventories effectively.

The AIM-R encountered a similar challenge related to residents' cognitive functioning. Although the test-retest agreement was acceptable across different levels of cognitive functioning, stakeholders noted that some questions were difficult for residents with dementia. However, stakeholders believe that when sufficient time is taken, most themes can be effectively queried, even among residents with cognitive decline. They found the descriptions of themes and examples helpful for usability and understandability. As stakeholders proposed, reducing the amount of text and administering the inventory over multiple meetings could further enhance usability and reliability for residents with moderate to severe dementia. Exploration of these proposals is warranted in future research. Future research may also explore the feasibility of incorporating observational instruments or proxy-reported scores, particularly for residents who experience challenges expressing themselves.

Finally, we observed measurement reactivity (French & Sutton, 2010), where the use of these inventories appeared to positively influence the awareness of potential mood-improving behaviors among residents and caregivers. Thematic analysis also revealed that residents enjoyed discussing pleasant activities, whereas caregivers reported increased awareness of mood-improving behaviors that could be integrated into their daily care practices. These unintentional positive impacts highlight the potential of these inventories to contribute to residents' well-being beyond their primary assessment purpose.

Strengths, constraints, and generality

A key strength of this research is its comprehensive, multi-phase, iterative, and mixed-methods approach. The combination of both quantitative data and profound qualitative insights enriched our understanding of selecting response options and allowed evaluation of reliability (in terms of test-retest and inter-rater agreement) and assessment of the inventories' usability in practical settings. Another notable strength of this study is the active involvement of nursing home residents and caregivers in the process of co-creation throughout the inventories' development, testing, and evaluation phases. Their valuable perspectives and experiences have not only contributed to the current refinement of the inventories, but also hold promise for future enhancements. Finally, the development of two inventories – each reflecting a different perspective (i.e., resident and caregiver behaviors) – considers the diverse population of nursing home residents, with varying degrees of physical and cognitive ability, and different preferences regarding mood-improving behaviors. The combination of these two perspectives may strengthen insight into additional and personalized strategies to improve the mood of residents.

However, it is also crucial to recognize certain limitations. First, the utilization of a formative measurement model for the inventories, while suitable for capturing the broad essence of the construct and providing practical guidance, introduces constraints. While formative measurement models are adept at evaluating specific indicators (i.e., themes within the inventories) by examining their distinct components, unlike reflective models, they do not facilitate the computation of a unified composite score for the overarching construct (Fried, 2017). Consequently, instead of deriving a total score for mood-improving behaviors, each item must be evaluated independently. This approach introduces challenges in establishing the construct and predictive validity of the overall construct, introduces sensitivity to measurement errors, and limits the ability to effectively summarize and compare data.

Furthermore, the inventories encompass numerous specific activities within different themes, thus exploring a wide range of behaviors while limiting the number of items.

The development of alternative instruments is necessary for assessing specific behaviors (e.g., watering the plants).

Methodological limitations include the variation in data collection methods during study 1, whereby nursing home residents were interviewed in person while caregivers completed an online survey. Although similar questions were employed, this variation, driven by practical considerations, may have affected the outcomes. Future research could benefit from conducting in-person cognitive interviews with caregivers or comprehensive online response process evaluations (Wolf et al., 2019). Additionally, exploring inter-rater agreement for the AIM-C through techniques such as cognitive interviewing can provide valuable insights into potential disparities between caregivers' responses.

Moreover, in this study, the AIM-R was completed during a structured face-to-face meeting with one of the interviewers. Although the interviewers were trained to administer the inventory, and each participating nursing home resident was asked the same questions in the same order, the existence of 'interviewer error' (biases or inaccuracies introduced by interviewers during the administration process) (Davis et al., 2009) cannot be completely ruled out. Notably, the AIM-R has thus not been evaluated for use by residents alone or together with family members or professional caregivers. Future research may explore alternatives, such as residents completing the AIM-R themselves as a self-report measure, or with family members or professional caregivers helping them complete it.

With respect to psychometric properties, it is essential to note that concurrent validity, which assesses the correctness of answers, was not established in this study. While the test-retest agreement was deemed acceptable, the study does not ascertain whether reported behaviors were indeed performed and experienced as pleasant by residents. Ensuring response reliability is a fundamental prerequisite for instrument validity (Hand, 2010), necessitating future validity assessments alongside reliability evaluations.

Finally, the application of these inventories to residents with severe cognitive decline presents challenges. Consequently, our findings may not be generalizable to all nursing home residents. Future measurement strategies such as shorter interviews should take these challenges into account. For the AIM-R, it may be beneficial to test proxy-reported inventories alongside resident self-reports and to consider incorporating visual aids to simplify the administration process.

After refining the inventories, we recommend comparing scores between the AIM-R and AIM-C to explore differences and similarities in actions undertaken by caregivers and nursing home residents. This comparative analysis may yield valuable insights into

essential themes for nursing home residents, as observed from different perspectives, and offer practical guidance for enhancing the mood of individual residents.

Conclusions

Overall, the results suggest that the inventories adequately capture mood-improving behaviors among both nursing home residents and caregivers, demonstrate consistent assessments over time, and can potentially increase awareness of potential mood-improving practices in nursing homes. Recommendations are provided to enhance their usability and interpretability for future research and practical application. Given the low levels of inter-rater reliability, we advise caution when using the AIM-C in its current form and recommend involving at least two caregivers to discuss and compare scores. While further research is pending, these inventories show promise for measuring mood-improving behaviors, aiding future studies in uncovering new insights into improving depression care in nursing homes alongside formal treatment options.

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Additional files

Additional file 1. Actions to Improve Mood by Residents inventory (AIM-R).

ACTIONS TO IMPROVE THE MOOD OF NURSING HOME RESIDENTS

Questionnaire for residents

INSTRUCTION

This questionnaire contains different types of activities and hobbies that people can enjoy. We would like to know how often you do these activities **in an average week**. We will also ask you if it makes you happy.

The questionnaire consists of several topics. The first topic is physical activity.

PHYSICAL ACTIVITY

Description: Activities focused on **physical activity**.

Examples:

- Walking, outdoors or indoors (across the hallway)
- Moving while seated
- Gymnastics
- Exercise group
- Dancing
- Cycling
- Billiards
- *Or any other activity focused on physical activity*

Regarding physical activity:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

CONTACT BY TOUCHING

Description: Activities aimed at **physical contact by touching**.

Like touching people, animals, or stuffed animals.

Examples:

- Hugging/embracing someone
- Holding someone's hand
- Petting animals
- Holding a (robot) stuffed animal on your lap
- *Or any other activity aimed at contact through touch*

Regarding contact by touching:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

TAKING CARE OF THE APPEARANCE

Description: Activities aimed at **taking care of your appearance**.

This concerns extra things, ***not*** daily care such as washing, dressing, and brushing teeth.

Examples:

- Going to the hairdresser
- Having feet or hands taken care of
- Dressing nicely
- Picking out new clothes
- Wearing jewellery
- Using perfume or aftershave
- *Or any other activity aimed at taking care of your appearance*

Regarding taking care of your appearance:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

RELAXATION

Description: Activities aimed at **resting or relaxing,** physically or mentally.

This is ***not*** about taking an afternoon nap, for example.

It ***is*** about **consciously doing something** to relax or unwind.

Examples:

- Doing yoga or relaxation exercises
- Listening to relaxing music
- Lying on a waterbed (a water-filled rubber or plastic mattress)
- *Or any other activity aimed at relaxation*

Regarding activities aimed at relaxation:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

HEALTHY LIVING

Description: Activities aimed at **healthy living**.

Examples:

- Getting daylight (e.g., sitting outside or sitting by the window)
- Opening the window
- Maintaining good balance between being active and taking a rest
- Eating healthy
- Going to bed and getting up at the same times
- *Or any other activity aimed at healthy living*

Regarding activities aimed at healthy living:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

HOUSEHOLD ACTIVITIES

Description: Activities aimed at the **household**.

Examples:

- Helping with cooking
- Washing dishes, loading/unloading the dishwasher
- Folding laundry
- Grocery shopping
- *Or any other activity aimed at the household*

Regarding household activities:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

CREATING SOMETHING

Description: Activities aimed at **creating something**.

Examples:

- Crafts
- Flower arranging
- Painting
- Creating cards
- Jobs
- Baking
- Photography
- *Or any other activity focused on creating something*

Regarding pursuits focused on creating something:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

BRAIN STIMULATION

Description: Activities aimed at **stimulating your brain**.

Examples:

- Reading (book, newspaper)
- Puzzles
- Cards
- Chess
- Playing games
- Following news
- Computing (tablet, laptop)
- Participating in knowledge quizzes
- *Or any other activity aimed at stimulating the brain*

Regarding brain stimulation:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

MUSIC

Description: Activities related to **music**.

Think of making music or listening to it attentively.

Examples:

- Listening to music (radio, CDs, LPs)
- Singing
- Playing an instrument
- Going to a concert
- *Or any other music-focused activity*

Concerning music-focused activities:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

GOING OUT

Description: Activities aimed at **going out**.

Examples:

- To city/village
- Theatre or museum
- Park of forest
- Restaurant, cafe, terrace (from a nursing home [residential care center] or elsewhere)
- *Or any other activity aimed at going out*

Regarding going out:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

PRECIOUS MEMORIES

Description: Retrieving activities aimed at **precious memories**.

Examples:

- Looking at photos
- Talking about the past
- Writing about events in your life (memoirs)
- Reminiscing through e.g., music, film, or a book
- Going to places that evoke memories
- Doing hobbies or work from the past
- *Or any other activity focused on precious memories*

As for retrieving precious memories:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

STIMULATING THE SENSES

Description: Activities aimed at consciously **stimulating your senses:** seeing, hearing, smelling, feeling, and tasting.

This is ***not*** about listening to music or making contact through touch.

Examples:

- Listening to nature sounds
- Feeling fabrics and materials
- Participating in tastings
- Using fragrance sticks
- *Or any other activity aimed at stimulating the senses*

Regarding stimulating your senses:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

CONTACT WITH OTHERS

Description: Activities aimed at social **contact with others**.

Remembering family, friends, fellow residents, staff, volunteers.

Examples:

- Drinking coffee together
- Chatting
- Walking together
- Inviting or visiting others
- Sending a card
- Calling
- *Or any other activity aimed at contact with others*

Regarding contact with others:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

NATURE

Description: Activities focused on **nature**.

Think of activities ***inside*** and ***outside*** a nursing home (residential care centre).

Examples:

- Walking outdoors
- Sitting outside (on the balcony)
- Gardening
- Going to the garden, forest, or park
- Caring for flowers or plants
- Listening to nature sounds or watching a nature movie
- Contact with (pets) animals
- *Or any other activity focused on nature*

Regarding activities focused on nature:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

FAITH AND MEANING

Description: Activities focused on **faith and meaning**.

Examples:

- Praying
- Going to a prayer room
- Talking to a spiritual caregiver
- Talking about faith
- Talking about life questions
- *Or any other activity focused on faith or meaning*

Regarding pursuits focused on faith and meaning:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

DOING SOMETHING FOR SOMEONE ELSE

Description: Activities aimed at consciously **doing something for someone else.**

Think of practical activities ***inside*** and ***outside*** a nursing home (residential care centre).

Examples:

- Helping with setting the table or cooking
- Helping other residents with food or taking them somewhere
- Being a member of the client council/residents council
- Being a member of or participating in an association
- Volunteering
- *Or any other activity focused on doing something for someone else*

Regarding doing something for another person:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

SECURITY AND WARMTH

Description: Activities aimed at **security and warmth**.

Think of offering security or warmth to family, friends, fellow residents, employees, or volunteers.

Examples:

- Reassuring, comforting, or supporting others
- Paying attention to the problems of others
- Being attentive to important events in the lives of others (e.g., pregnancy, weddings, holidays)
- Paying attention to the interests or activities of others
- Hugging/embracing
- *Or any other activity aimed at security and warmth*

Regarding activities focused on security and warmth:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

POSITIVE ATTITUDE

Description: Activities aimed at a **positive attitude.**

Examples:

- Giving compliments
- Using humour (making a joke)
- Starting the day with a fun activity
- Greeting others in the hallway
- *Or any other activity focused on a positive attitude*

Regarding activities aimed at a positive attitude:

1. **How often do you do this in an average week?**

○ Never
○ Occasionally
○ Regularly
○ Frequently
○ Very often

2. **If you do (or would do) this, does this make you feel happy?**

○ No
○ Yes, a bit happy
○ Yes, very happy

Note. The translation of this inventory from Dutch into English is not validated

Additional file 2. Actions to Improve Mood by Caregivers inventory (AIM-C).

ACTIONS TO IMPROVE THE MOOD OF NURSING HOME RESIDENTS

Questionnaire for caregivers

INSTRUCTION

This questionnaire contains several actions that can affect the mood of residents in a nursing home (or residential care centre). You and your colleagues can make an important contribution to residents' mood by engaging in such actions. For the purposes of this questionnaire, "colleagues" and "caregivers" here refers to **those who provide direct care to residents**.

This questionnaire is not asking whether the activities described are planned as part of a resident's daily program, but rather to what extent you and your colleagues help residents do the activities described. This is about stimulation (for example, getting the resident excited about a group activity) and about doing things together, such as having coffee with a resident.

Consider one specific resident for whom you are completing this questionnaire. We would like to know how often you or your care colleagues do these things for this resident **in an average week**. You may give an estimate for this. We also ask how happy it makes the resident.

The questionnaire consists of 18 different topics. The first topic is physical activity.

Note. The translation of this inventory from Dutch into English is not validated

PHYSICAL ACTIVITY

Description: To stimulate the resident in or do activities together aimed at **physical activity**.

Examples:

- Walking together, outdoors or indoors (across the hallway)
- Inviting the resident to dance
- Encouraging (seated) exercise
- Letting the resident make their own sandwiches, or doing household chores together
- Expressing enthusiasm about an exercise activity
- *Or any other activity aimed at encouraging physical activity*

As for encouraging physical activity:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

CONTACT BY TOUCHING

Description: To stimulate the resident in or do activities together aimed at physical **contact by touching**.

Examples:

- Hugging/embracing the resident
- Holding their hand or putting your hand on their shoulder
- (hand) massage
- Petting animals
- Giving a (robot) stuffed animal
- *Or any other activity aimed at encouraging contact through touching*

As for encouraging contact through touching:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

TAKING CARE OF THE APPEARANCE

Description: To stimulate the resident in or do activities together aimed at **taking care of their personal appearance**.

These are extra things, ***not*** regular daily care such as washing, dressing, and brushing your teeth.

Examples:

- Picking clothes together
- Complimenting a resident's clothing or hairstyle
- Have the resident look in the mirror
- Painting nails or putting on makeup
- *Or any other activity aimed at stimulating taking care of one's appearance*

Regarding encouraging taking care of the appearance:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

RELAXATION

Description: To stimulate the resident in or do activities together aimed at physically or mentally relaxing or **unwinding.**

This is ***not*** about, for example, encouraging the resident to take an afternoon nap. It ***is*** about **consciously doing something** to relax or unwind.

Examples:

- Turning on soothing music
- Taking the resident to a quiet place
- Performing a relaxation exercise
- Using a waterbed (a water-filled rubber or plastic mattress)
- Removing disruptive stimuli
- *Or any other activity aimed at promoting relaxation*

Regarding encouraging activities aimed at relaxation:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

HEALTHY LIVING

Description: To stimulate the resident in or do activities together aimed at **healthy living**.

Examples:

- Taking advantage of daylight (e.g., going outside together or having the resident sit by the window)
- Opening a window
- Ensuring balance between being active and resting
- Encouraging healthy eating (e.g., putting fruit bowl on the table)
- *Or any other activity aimed at encouraging pursuits aimed at healthy living*

Regarding stimulating activities aimed at healthy living:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

HOUSEHOLD ACTIVITIES

Description: To stimulate the resident in or do activities together aimed at the **household**.

Examples:

- Asking resident to help with cooking, setting the table, washing dishes, or loading/unloading dishwasher
- Making the bed together
- Having your own laundry folded
- *Or any other activity aimed at stimulating household activities*

Regarding encouraging pursuits focused on the household:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

CREATING SOMETHING

Description: To stimulate the resident in or do activities together aimed at **creating something**.

Examples:

- Crafting together, flower arranging, painting, card making
- Asking the resident to help with baking
- Getting a job done
- Encouraging the resident to do a creative activity or hobby of their own
- Giving compliments about a painting or flower arrangement
- Placing knitting needles and yarn on the table
- *Or any other activity aimed at stimulating pursuits aimed at making something*

Regarding encouraging pursuits focused on making something:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

BRAIN STIMULATION

Description: To stimulate the resident in or do activities together aimed at **stimulating the brain.**

Examples:

- Playing a game, playing cards together
- Reading or discussing news
- Organizing a quiz
- Placing puzzles or magazines on the table
- Computing together (tablet, laptop)
- *Or any other activity aimed at stimulating the brain*

Regarding brain stimulation:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

MUSIC

Description: To stimulate the resident in or do activities together aimed at **music**.

Think of making music or listening to music attentively.

Examples:

- Turning on the radio, CD, LP, or music video (DVD)
- Singing a song
- Playing music together
- Asking about favorite music
- *Or any other activity aimed at stimulating pursuits focused on music*

Regarding encouraging pursuits focused on music:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

GOING OUT

Description: To stimulate the resident in or do activities together aimed at **going out**.

Examples:

- Going to town/village together
- Eating ice cream or having a drink together
- Encouraging people to come along to gardens or parks (of a nursing home [residential care centre] or elsewhere)
- Encouraging self-discovery
- Arranging for the resident to go out with someone else
- *Or any other activity aimed at encouraging going out*

Regarding encouraging to go out:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

PRECIOUS MEMORIES

Description: To stimulate the resident in or do activities together aimed at **precious memories**.

Examples:

- Looking at photos together
- Starting a conversation about a photo in the resident's room
- Reminiscing through things like music, films, or books
- Asking about past events (e.g., family, work, hobbies, how holidays were celebrated)
- Bringing together residents with similar life histories
- Showing recognizable objects from the past or putting them on the table
- *Or any other activity aimed at stimulating precious memories*

Regarding fostering precious memories:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

STIMULATING THE SENSES

Description: To stimulate the resident in or do activities together aimed at consciously **stimulating the senses:** seeing, hearing, smelling, feeling, and tasting.

This is ***not*** about listening to music or physical contact through touch.

Examples:

- Snuggling or magic table
- Tasting something
- Touching fabrics or materials
- Using fragrance sticks
- Turning on nature sounds
- *Or any other activity aimed at stimulating the senses*

Regarding stimulating the senses:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

CONTACT WITH OTHERS

Description: To stimulate the resident in or do activities together aimed at social **contact with others.**

Remembering family, friends, fellow residents, staff, volunteers.

Examples:

- Drinking coffee together
- Chatting or spending the day together
- Letting residents with similar interests sit together
- Helping residents and family members talk to each other
- Helping write cards
- Helping with (video/internet) calls
- Creating cosy seating areas (e.g., sitting area, cosy decoration)
- *Or any other activity aimed at encouraging contact with others*

Regarding encouraging contact with others:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

NATURE

Description: To stimulate the resident in or do activities together aimed at **nature**.

Think of activities ***inside*** and ***outside*** a nursing home (residential care centre).

Examples:

- Asking the resident to help with gardening or plant care
- Taking a walk outside together or sitting on the balcony
- Encouraging the resident to go to a garden, forest, animal pasture or park
- Playing nature sounds
- putting (artificial) flowers or plants in the hallway
- Showing photos or videos of nature
- Having the resident sit by the window
- *Or any other activity aimed at encouraging occupations focused on nature*

Regarding encouraging pursuits focused on nature:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

FAITH AND MEANING

Description: To stimulate the resident in or do activities together aimed at **faith and meaning.**

Examples:

- Talking about faith
- Talking about life questions
- Encouraging contact with a spiritual caregiver
- Encouraging going to prayer room
- *Or any other activity aimed at stimulating activities aimed at faith and meaning*

Regarding encouraging pursuits focused on faith and meaning:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

DOING SOMETHING FOR SOMEONE ELSE

Description: To stimulate the resident in or do activities together aimed at **doing something for another person**.

Think of practical activities ***inside*** and ***outside*** a nursing home (residential care centre).

Examples:

- Asking if the resident wants to help with anything (e.g., setting the table, cooking)
- Asking the resident to help another resident (e.g., with food, taking him/her somewhere)
- Asking the resident to do a chore for you
- *Or any other activity aimed at encouraging someone else to do something*

Regarding encouraging to do something for someone else:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

SECURITY AND WARMTH

Description: Actions aimed at **security and warmth**.

Things like providing security or warmth to the resident or encouraging the resident to support others.

Examples:

- Reassuring, comforting, or tucking the resident in
- Being attentive to the resident's worries or fears
- Hugging/embracing the resident
- Offering the resident a hot water bottle or bean bag
- Asking if the resident would like to support another resident
- *Or any other activity aimed at security and warmth*

Regarding actions aimed at security and warmth:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

POSITIVE ATTITUDE

Description: Actions aimed at a **positive attitude.**

Examples:

- Complimenting the resident
- Using humour (making a joke)
- Starting the day with a fun activity
- Greeting the resident in the corridor
- Highlighting what goes well
- Sharing pleasant events
- *Or any other activity aimed at a positive attitude*

Regarding actions aimed at a positive attitude:

1. How often do you or your colleagues do this in an average week?

Never	Occasionally	Regularly	Frequently	Very often
O	O	O	O	O

2. If you do (or would do) this, does this make the resident feel happy?

No	Yes, a bit happy	Yes, very happy
O	O	O

Note. The translation of this inventory from Dutch into English is not validated

Additional file 3. Agreement statistics for the test-retest agreement of the AIM-R and AIM-C by country and level of cognitive functioning.

			Country								Cognitive functioning							
			Netherlands				Belgium				No to mild cognitive decline (GDS ≤ 3)				Moderate to severe cognitive decline (GDS ≥ 4)			
	Theme	Item	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]
AIM-R	1. Physical activity	Frequency	120	14 21 24 9 7	.76 [.71;.82]	Good	82	5 5 5 3 30	.60 [.47;.74]	Moderate	116	14 13 19 6 20	.70 [.61;.78]	Good	45	2 10 6 3 4	.65 [.50;.79]	Moderate
		Expected effect	119	20 34 38	.78 [.69;.87]	Good	80	8 13 30	.65 [.51;.80]	Moderate	114	18 27 36	.73 [.63;.83]	Good	45	3 12 18	.75 [.58;.91]	Good
	2. Contact by touching	Frequency	116	23 25 13 8 3	.75 [.68;.82]	Good	77	12 9 8 2 8	.51 [.37;.66]	Moderate	111	23 18 12 6 6	.66 [.56;.75]	Moderate	43	7 8 5 3 1	.64 [.49;.80]	Moderate
		Expected effect	117	22 34 41	.82 [.74;.91]	Good	76	5 5 4 3	.72 [.58;.86]	Good	109	17 23 45	.75 [.64;.86]	Good	44	6 9 18	.77 [.61;.93]	Good
	3. Taking care of the appearance	Frequency	118	13 19 20 8 10	.70 [.63;.78]	Good	81	2 36 6 0 9	.77 [.68;.87]	Good	115	10 31 17 7 8	.74 [.67;.82]	Good	42	2 6 4 1 7	.63 [.51;.75]	Moderate
		Expected effect	118	25 28 46	.81 [.71;.90]	Good	81	8 17 30	.70 [.58;.83]	Good	115	21 25 44	.80 [.71;.89]	Good	42	6 11 17	.79 [.62;.95]	Good
	4. Relaxation	Frequency	117	46 10 7 4 3	.75 [.67;.82]	Good	72	16 2 2 1 18	.48 [.32;.65]	Fair	108	29 7 8 4 14	.63 [.52;.74]	Moderate	44	21 2 0 1 1	.74 [.60;.87]	Good
		Expected effect	117	53 29 11	.78 [.69;.87]	Good	72	9 8 25	.55 [.37;.73]	Moderate	109	28 22 24	.62 [.49;.75]	Moderate	44	24 9 4	.83 [.69;.97]	Good
	5. Healthy living	Frequency	114	11 10 11 10 10	.60 [.52;.68]	Moderate	73	4 1 0 1 51	.85 [.76;.94]	Good	106	6 8 9 3 37	.70 [.61;.80]	Good	41	7 1 2 6 4	.64 [.53;.76]	Moderate
		Expected effect	114	29 41 13	.68 [.57;.79]	Moderate	73	7 13 23	.65 [.51;.79]	Moderate	107	19 33 17	.67 [.56;.78]	Moderate	41	11 14 7	.69 [.49;.89]	Moderate
	6. Household activities	Frequency	118	56 14 10 1 3	.81 [.74;.88]	Good	79	41 7 1 2 5	.80 [.70;.90]	Good	112	55 11 4 2 7	.79 [.71;.88]	Good	44	22 4 5 0 1	.83 [.72;.94]	Good
		Expected effect	117	56 31 9	.82 [.74;.91]	Good	77	13 15 18	.54 [.38;.70]	Moderate	114	41 24 20	.71 [.60;.82]	Good	44	20 12 2	.75 [.58;.92]	Good
	7. Creating something	Frequency	117	50 16 7 4 5	.84 [.78;.89]	Good	81	40 14 3 0 5	.87 [.80;.94]	Very good	113	49 20 6 2 8	.85 [.78;.91]	Good	43	17 5 4 0 1	.80 [.70;.90]	Good
		Expected effect	115	42 21 36	.85 [.76;.93]	Good	71	14 8 23	.54 [.36;.72]	Fair	106	26 17 40	.73 [.61;.85]	Good	43	17 7 10	.81 [.67;.95]	Good
	8. Brain stimulation	Frequency	120	8 4 4 9 31	.63 [.55;.72]	Moderate	79	3 1 2 1 48	.75 [.63;.87]	Good	113	4 4 2 7 43	.64 [.54;.75]	Moderate	45	7 1 4 3 11	.68 [.54;.81]	Moderate
		Expected effect	120	11 20 58	.78 [.68;.87]	Good	79	4 19 26	.69 [.56;.82]	Moderate	112	3 24 45	.69 [.57;.80]	Moderate	45	9 5 21	.85 [.74;.96]	Good
	9. Music	Frequency	121	14 14 15 14 17	.71 [.64;.79]	Good	77	12 10 3 1 22	.60 [.47;.74]	Moderate	112	15 14 10 9 21	.67 [.57;.76]	Moderate	46	6 6 4 4 7	.65 [.49;.81]	Moderate
		Expected effect	121	16 21 71	.93 [.89;.98]	Very good	80	6 10 39	.69 [.55;.84]	Moderate	113	13 12 60	.81 [.73;.90]	Good	46	6 10 29	.99 [.97;1.00]	Very good
	10. Going out	Frequency	117	17 34 10 4 4	.77 [.71;.83]	Good	77	10 21 8 0 5	.70 [.59;.80]	Good	113	15 31 10 3 4	.72 [.65;.80]	Good	42	8 13 4 1 3	.82 [.74;.91]	Good
		Expected effect	117	3 21 71	.83 [.75;.92]	Good	77	5 8 40	.73 [.60;.86]	Good	110	4 18 62	.80 [.71;.90]	Good	43	3 5 25	.76 [.59;.94]	Good
	11. Precious memories	Frequency	119	9 20 14 5 11	.65 [.58;.73]	Moderate	79	8 14 8 2 7	.60 [.48;.72]	Moderate	111	6 20 12 3 8	.59 [.50;.68]	Moderate	45	5 8 6 2 5	.73 [.62;.84]	Good
		Expected effect	117	18 33 41	.85 [.78;.91]	Good	72	8 10 24	.53 [.36;.71]	Fair	111	13 25 38	.70 [.59;.81]	Good	44	8 9 18	.85 [.73;.96]	Good
	12. Stimulating the senses	Frequency	103	55 12 1 1 0	.84 [.78;.90]	Good	70	26 5 1 0 7	.56 [.39;.72]	Moderate	100	41 10 1 1 6	.70 [.60;.81]	Good	37	21 5 0 0 0	.83 [.72;.95]	Good
		Expected effect	100	56 19 8	.83 [.74;.92]	Good	63	5 9 20	.45 [.25;.66]	Fair	97	31 18 20	.66 [.53;.79]	Moderate	34	22 3 2	.84 [.70;.98]	Good

Additional file 3. Continued

			Country								Cognitive functioning							
			Netherlands				Belgium				No to mild cognitive decline (GDS ≤ 3)				Moderate to severe cognitive decline (GDS ≥ 4)			
	Theme	Item	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]
	13. Contact with others	Frequency	118	1 18 10 11 21	.68 [.61;.75]	Good	76	3 1 5 1 31	.64 [.52;.76]	Moderate	110	2 14 8 5 32	.68 [.60;.76]	Good	44	1 3 4 5 8	.62 [.49;.75]	Moderate
		Expected effect	117	5 28 64	.90 [.84;.95]	Very good	76	1 8 51	.83 [.73;.94]	Good	111	4 19 68	.86 [.78;.93]	Good	43	1 10 24	.92 [.87;.98]	Very good
	14. Nature	Frequency	118	7 17 12 11 10	.66 [.59;.72]	Good	78	9 16 5 2 15	.57 [.42;.72]	Moderate	111	8 20 9 8 12	.62 [.53;.71]	Moderate	43	3 6 4 3 5	.65 [.54;.76]	Moderate
		Expected effect	120	5 28 67	.89 [.83;.95]	Very good	78	4 9 37	.71 [.58;.84]	Good	112	5 20 54	.78 [.69;.87]	Good	45	2 10 29	.92 [.82;1.00]	Very good
	15. Faith and meaning	Frequency	113	47 17 10 3 7	.83 [.76;.90]	Good	76	19 10 4 0 26	.79 [.68;.89]	Good	109	32 19 4 2 24	.78 [.70;.86]	Good	42	18 5 4 0 4	.83 [.72;.95]	Good
		Expected effect	112	46 30 16	.80 [.71;.89]	Good	71	17 12 20	.74 [.63;.86]	Good	105	33 20 23	.74 [.65;.84]	Good	41	15 11 6	.75 [.59;.92]	Good
	16. Doing something for someone else	Frequency	115	39 10 11 6 0	.71 [.63;.79]	Good	73	21 7 1 1 16	.67 [.54;.80]	Moderate	105	33 13 8 4 7	.67 [.56;.78]	Moderate	43	13 1 2 3 1	.62 [.48;.77]	Moderate
		Expected effect	114	30 21 36	.74 [.64;.85]	Good	75	3 11 32	.69 [.56;.83]	Moderate	105	14 18 39	.70 [.59;.81]	Good	45	12 8 15	.77 [.61;.93]	Good
	17. Security and warmth	Frequency	109	16 17 15 9 7	.72 [.65;.79]	Good	64	5 11 6 1 7	.52 [.39;.66]	Moderate	98	11 12 13 7 8	.60 [.50;.70]	Moderate	41	5 11 4 2 2	.73 [.62;.85]	Good
		Expected effect	110	10 28 46	.85 [.79;.91]	Very good	68	3 12 30	.73 [.61;.86]	Good	101	7 20 45	.80 [.72;.89]	Good	42	3 11 16	.82 [.70;.93]	Good
	18. Positive attitude	Frequency	112	7 10 14 10 14	.62 [.55;.70]	Moderate	65	0 4 1 2 26	.53 [.36;.70]	Moderate	97	2 6 8 5 23	.49 [.37;.62]	Fair	43	5 6 4 5 6	.70 [.58;.82]	Good
		Expected effect	113	8 26 48	.81 [.73;.88]	Good	68	2 12 34	.80 [.69;.91]	Good	101	2 21 45	.80 [.72;.88]	Good	44	5 7 20	.77 [.61;.92]	Good
AIM-C	**1. Physical activity**	Frequency	94	11 14 14 11 4	.68 [.60;.77]	Good	31	3 3 4 2 0	.53 [.35;.70]	Fair	84	11 14 12 4 3	.64 [.55;.74]	Moderate	36	2 3 6 8 1	.68 [.55;.82]	Moderate
		Expected effect	93	16 25 22	.62 [.48;.76]	Moderate	30	1 12 5	.57 [.31;.84]	Fair	83	13 28 18	.66 [.52;.80]	Moderate	36	3 9 7	.49 [.24;.74]	Fair
	2. Contact by touching	Frequency	94	10 26 8 5 2	.75 [.69;.81]	Good	31	5 6 0 3 0	.68 [.55;.80]	Moderate	84	12 20 6 4 0	.72 [.65;.79]	Good	36	2 11 2 4 1	.76 [.66;.86]	Good
		Expected effect	92	11 38 17	.69 [.56;.81]	Moderate	27	1 8 10	.75 [.55;.95]	Moderate	78	9 31 18	.73 [.61;.86]	Good	36	2 14 7	.62 [.40;.85]	Moderate
	3. Taking care of the appearance	Frequency	93	7 12 16 13 8	.70 [.61;.80]	Good	31	4 4 5 1 2	.57 [.38;.76]	Moderate	84	9 13 14 8 4	.65 [.53;.76]	Moderate	35	1 3 7 5 4	.73 [.61;.85]	Good
		Expected effect	92	9 32 36	.80 [.69;.91]	Good	30	2 8 5	.56 [.32;.80]	Fair	82	7 28 24	.71 [.58;.84]	Moderate	35	3 11 14	.77 [.57;.96]	Good
	4. Relaxation	Frequency	94	32 11 11 4 4	.77 [.69;.85]	Good	31	8 5 0 1 0	.58 [.38;.77]	Moderate	84	34 11 4 4 2	.76 [.67;.85]	Good	36	5 5 7 1 1	.68 [.52;.84]	Moderate
		Expected effect	91	26 35 9	.71 [.59;.83]	Good	23	4 8 0	.50 [.19;.81]	Fair	76	22 27 4	.65 [.51;.79]	Moderate	33	7 15 3	.72 [.51;.93]	Moderate
	5. Healthy living	Frequency	92	8 13 15 9 3	.66 [.58;.75]	Moderate	31	3 6 3 2 1	.57 [.37;.78]	Moderate	83	8 12 15 8 0	.65 [.55;.75]	Moderate	35	3 7 3 2 2	.64 [.49;.79]	Moderate
		Expected effect	92	15 39 9	.68 [.55;.80]	Moderate	28	3 14 0	.72 [.53;.91]	Moderate	80	10 39 3	.70 [.58;.83]	Good	35	7 13 5	.66 [.44;.88]	Moderate
	6. Household activities	Frequency	93	42 12 4 3 1	.79 [.71;.87]	Good	31	10 4 1 1 1	.72 [.57;.87]	Good	84	38 12 3 1 1	.81 [.74;.89]	Good	35	13 4 1 2 1	.73 [.58;.88]	Good
		Expected effect	90	50 14 4	.75 [.64;.86]	Good	23	8 6 2	.59 [.32;.87]	Fair	74	40 11 4	.70 [.56;.84]	Moderate	34	16 8 2	.77 [.60;.94]	Good
	7. Creating something	Frequency	94	21 13 12 9 1	.73 [.65;.80]	Good	31	6 6 0 3 0	.64 [.47;.81]	Moderate	84	22 13 8 7 0	.73 [.65;.82]	Good	36	4 6 4 3 1	.66 [.53;.79]	Moderate
		Expected effect	91	25 26 21	.77 [.67;.88]	Good	26	4 9 4	.59 [.32;.85]	Fair	77	19 24 18	.77 [.66;.89]	Good	35	8 10 6	.61 [.40;.83]	Moderate

Additional file 3. Continued

			Country								Cognitive functioning							
			Netherlands				Belgium				No to mild cognitive decline (GDS ≤ 3)				Moderate to severe cognitive decline (GDS ≥ 4)			
	Theme	Item	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]
	8. Brain stimulation	Frequency	94	18 11 14 9 4	.72 [.64;.80]	Good	31	3 5 4 1 0	.55 [.37;.73]	Moderate	84	15 12 10 3 3	.67 [.58;.75]	Good	36	4 4 8 6 1	.74 [.61;.87]	Good
		Expected effect	92	20 32 19	.75 [.64;.86]	Good	29	2 14 1	.69 [.48;.89]	Moderate	80	13 30 12	.68 [.55;.81]	Moderate	36	7 16 8	.87 [.74;1.00]	Good
	9. Music	Frequency	94	19 10 17 6 2	.71 [.63;.79]	Good	30	4 6 1 0 0	.52 [.33;.71]	Fair	83	20 15 8 2 0	.68 [.59;.77]	Moderate	36	3 1 10 3 2	.66 [.50;.82]	Moderate
		Expected effect	92	18 27 22	.68 [.55;.81]	Moderate	26	2 8 6	.63 [.35;.91]	Moderate	78	16 23 15	.66 [.52;.81]	Moderate	35	3 10 12	.66 [.42;.90]	Moderate
	10. Going out	Frequency	93	21 27 12 8 1	.82 [.75;.90]	Good	30	7 6 4 0 0	.64 [.43;.85]	Moderate	82	19 26 9 3 0	.77 [.67;.87]	Good	36	8 6 7 4 1	.84 [.75;.93]	Good
		Expected effect	92	12 24 39	.82 [.73;.92]	Good	28	2 4 15	.86 [.74;.98]	Good	80	8 21 36	.85 [.77;.94]	Good	35	6 6 15	.77 [.58;.96]	Good
	11. Precious memories	Frequency	94	3 22 21 9 0	.74 [.67;.82]	Good	31	2 6 2 2 0	.57 [.40;.74]	Moderate	84	3 24 9 5 0	.68 [.60;.77]	Good	36	2 3 13 4 0	.79 [.68;.89]	Good
		Expected effect	93	3 42 29	.90 [.85;.95]	Very good	30	0 8 11	.69 [.47;.91]	Moderate	82	3 32 25	.83 [.75;.91]	Good	36	0 17 13	.89 [.78;1.00]	Very good
	12. Stimulating the senses	Frequency	94	52 13 3 1 1	.86 [.79;.92]	Very good	31	13 4 0 0 0	.78 [.67;.90]	Good	84	52 8 0 1 0	.88 [.83;.94]	Very good	36	11 8 3 0 1	.76 [.63;.90]	Good
		Expected effect	90	53 19 3	.81 [.72;.91]	Good	23	6 8 1	.59 [.32;.86]	Fair	75	43 16 2	.80 [.69;.91]	Good	33	14 11 2	.75 [.56;.94]	Moderate
	13. Contact with others	Frequency	94	2 9 18 18 1	.65 [.55;.74]	Moderate	31	4 6 4 2 1	.65 [.47;.83]	Moderate	84	5 13 12 14 1	.65 [.54;.75]	Moderate	36	1 2 9 5 1	.67 [.53;.81]	Moderate
		Expected effect	93	7 26 32	.68 [.55;.81]	Moderate	29	1 8 10	.77 [.62;.93]	Good	81	6 21 28	.69 [.55;.82]	Moderate	36	2 13 11	.73 [.54;.91]	Moderate
	14. Nature	Frequency	94	26 12 8 6 0	.71 [.63;.79]	Good	31	11 4 2 0 0	.72 [.57;.88]	Moderate	84	26 12 7 4 0	.75 [.68;.83]	Good	36	10 4 3 2 0	.70 [.58;.83]	Good
		Expected effect	92	26 19 21	.65 [.51;.79]	Moderate	25	5 7 5	.60 [.30;.90]	Fair	77	23 18 15	.65 [.50;.81]	Moderate	35	7 7 10	.65 [.43;.87]	Moderate
	15. Faith and meaning	Frequency	94	37 28 4 0 2	.88 [.82;.93]	Very good	30	7 5 1 2 0	.62 [.41;.82]	Moderate	83	30 25 2 1 0	.80 [.72;.89]	Good	36	13 6 3 0 2	.84 [.77;.92]	Good
		Expected effect	90	46 16 7	.74 [.63;.85]	Good	27	6 3 4	.36 [.07;.65]	Poor	78	29 15 6	.59 [.44;.73]	Moderate	34	21 4 3	.81 [.64;.97]	Good
	16. Doing something for someone else	Frequency	94	38 13 2 7 1	.76 [.67;.85]	Good	31	14 6 0 2 1	.87 [.79;.96]	Very good	84	40 12 0 5 1	.82 [.75;.90]	Good	36	11 6 2 4 1	.75 [.61;.90]	Good
		Expected effect	92	41 17 9	.67 [.54;.80]	Moderate	23	5 9 3	.73 [.51;.96]	Moderate	76	30 20 8	.73 [.61;.86]	Good	34	14 6 4	.63 [.39;.86]	Moderate
	17. Security and warmth	Frequency	94	9 26 8 9 4	.70 [.62;.79]	Good	31	3 5 3 1 1	.58 [.42;.73]	Moderate	84	9 22 7 7 2	.70 [.62;.79]	Good	36	3 9 4 2 2	.64 [.47;.80]	Moderate
		Expected effect	93	11 31 24	.67 [.55;.80]	Moderate	28	0 7 9	.56 [.28;.84]	Fair	80	7 23 25	.65 [.51;.80]	Moderate	36	4 13 6	.62 [.42;.83]	Moderate
	18. Positive attitude	Frequency	94	1 4 19 28 8	.78 [.71;.85]	Good	31	0 2 0 3 6	.48 [.28;.67]	Fair	84	1 5 11 23 8	.69 [.60;.79]	Good	36	0 1 7 6 4	.69 [.57;.82]	Moderate
		Expected effect	93	1 33 38	.90 [.87;.94]	Very good	31	0 6 12	.74 [.56;.91]	Moderate	83	1 22 35	.84 [.77;.91]	Good	36	0 15 13	.90 [.85;.97]	Very good

Note. AIM-R = Actions to Improve Mood by Residents, AIM-C = Actions to Improve Mood by Caregivers, N = Valid number of participants, CI = Confidence Interval, GDS = Global Deterioration Scale
[a]Altman's benchmarking 5-point scale ranging from "poor" to "very good" was used to interpret the magnitude of the AC2 coefficients. A cumulative probability of above .95 was applied to determine the lowest expected agreement level

Additional file 4. Agreement statistics for the inter-rater agreement of the AIM-C by country and level of cognitive functioning.

			Country								Cognitive functioning							
			Netherlands				Belgium				No to mild cognitive decline (GDS ≤ 3)				Moderate to severe cognitive decline (GDS ≥ 4)			
	Theme	Item	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]
AIM-C	1. Physical activity	Frequency	45	25811	.43 [.23;.62]	Fair	36	44420	.40 [.18;.61]	Fair	58	58801	.39 [.21;.57]	Fair	18	01320	.48 [.21;.76]	Fair
		Expected effect	45	4811	.45 [.22;.69]	Fair	35	296	.59 [.38;.79]	Moderate	57	51212	.50 [.31;.69]	Fair	18	024	.43 [.06;.79]	Poor
	2. Contact by touching	Frequency	45	47330	.53 [.38;.67]	Moderate	36	43121	.35 [.16;.55]	Poor	58	78221	.47 [.33;.61]	Fair	18	02130	.43 [.17;.70]	Fair
		Expected effect	45	4164	.49 [.24;.73]	Fair	34	1106	.55 [.32;.79]	Fair	56	4216	.58 [.38;.77]	Moderate	18	033	.29 [-.15;.74]	Poor
	3. Taking care of the appearance	Frequency	44	04241	.32 [.15;.50]	Poor	37	12511	.40 [.20;.60]	Fair	58	14641	.43 [.29;.57]	Fair	18	01011	.21 [-.06;.48]	Poor
		Expected effect	44	2913	.67 [.51;.84]	Moderate	35	1103	.56 [.34;.77]	Fair	56	31710	.66 [.52;.81]	Moderate	18	026	.69 [.47;.92]	Moderate
	4. Relaxation	Frequency	44	92411	.46 [.28;.64]	Fair	37	97000	.54 [.35;.73]	Fair	58	176111	.55 [.39;.70]	Moderate	18	11300	.45 [.20;.69]	Fair
		Expected effect	43	5142	.35 [.08;.62]	Poor	31	3110	.36 [.06;.67]	Poor	52	8172	.42 [.21;.63]	Fair	17	050	.16 [-.38;.70]	Poor
	5. Healthy living	Frequency	43	04340	.30 [.10;.51]	Poor	37	01130	.23 [.06;.41]	Poor	58	05360	.37 [.22;.51]	Fair	17	00000	-.05 [-.33;.24]	Poor
		Expected effect	43	3133	.38 [.14;.63]	Poor	34	290	.42 [.16;.68]	Fair	55	3172	.53 [.36;.70]	Fair	17	131	.01 [-.44;.45]	Poor
	6. Household activities	Frequency	43	143200	.62 [.47;.77]	Moderate	37	142000	.61 [.43;.80]	Moderate	58	242100	.66 [.53;.80]	Moderate	17	33100	.56 [.32;.81]	Fair
		Expected effect	42	1952	.55 [.34;.76]	Fair	31	951	.33 [.06;.60]	Poor	51	2163	.49 [.29;.69]	Fair	17	530	.37 [.03;.72]	Poor
	7. Creating something	Frequency	45	75631	.57 [.40;.73]	Moderate	36	62120	.40 [.21;.59]	Fair	58	106540	.54 [.40;.68]	Moderate	18	21201	.45 [.22;.67]	Fair
		Expected effect	43	1199	.61 [.40;.82]	Moderate	31	464	.33 [.02;.63]	Poor	52	11810	.48 [.28;.69]	Fair	17	363	.62 [.26;.99]	Fair
	8. Brain stimulation	Frequency	45	43630	.44 [.28;.60]	Fair	35	53710	.48 [.25;.70]	Fair	57	75920	.49 [.35;.64]	Fair	18	01410	.38 [.06;.71]	Poor
		Expected effect	44	397	.30 [.04;.56]	Poor	33	2122	.57 [.36;.79]	Fair	54	3157	.43 [.22;.64]	Fair	18	051	.29 [-.15;.74]	Poor
	9. Music	Frequency	45	32730	.42 [.25;.60]	Fair	36	23211	.22 [-.01;.45]	Poor	58	55711	.38 [.22;.55]	Fair	18	00130	.35 [.07;.63]	Poor
		Expected effect	44	1912	.31 [.03;.59]	Poor	31	192	.35 [.02;.69]	Poor	52	2138	.25 [-.02;.52]	Poor	18	026	.49 [.11;.87]	Poor
	10. Going out	Frequency	45	315231	.49 [.26;.72]	Fair	35	53100	.37 [.17;.57]	Fair	57	717221	.59 [.43;.75]	Moderate	18	01010	.04 [-.21;.29]	Poor
		Expected effect	44	0119	.47 [.23;.72]	Fair	33	0512	.52 [.25;.80]	Fair	54	01217	.71 [.58;.84]	Good	18	023	-.13 [-.62;.36]	Poor
	11. Precious memories	Frequency	45	06941	.66 [.55;.77]	Moderate	36	05310	.38 [.19;.58]	Fair	58	010931	.56 [.44;.69]	Moderate	18	01320	.63 [.46;.79]	Moderate
		Expected effect	45	01011	.65 [.49;.81]	Moderate	34	0126	.66 [.47;.84]	Moderate	56	0179	.60 [.43;.76]	Moderate	18	036	.73 [.54;.92]	Moderate

Additional file 4. Continued

		Country								Cognitive functioning							
		Netherlands				Belgium				No to mild cognitive decline (GDS ≤ 3)				Moderate to severe cognitive decline (GDS ≥ 4)			
Theme	Item	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]	N	Agreement diagonal	Gwet's AC2 estimate [95% CI]	Altman's benchmark scale[a]
12. Stimulating the senses	Frequency	45	154110	.54 [.36;.72]	Fair	36	202100	.79 [.65;.93]	Good	58	324210	.78 [.66;.89]	Good	18	21000	.31 [.06;.56]	Poor
	Expected effect	41	1181	.26 [.00;.52]	Poor	30	1190	.61 [.37;.85]	Moderate	50	20121	.57 [.37;.76]	Moderate	16	130	-.16 [-.64;.33]	Poor
13. Contact with others	Frequency	45	06550	.46 [.28;.64]	Fair	36	21301	.25 [.05;.46]	Poor	58	26441	.34 [.18;.51]	Fair	18	01410	.43 [.09;.78]	Poor
	Expected effect	45	111 10	.54 [.33;.76]	Fair	33	1510	.74 [.63;.86]	Good	55	21314	.71 [.59;.83]	Good	18	034	.40 [-.01;.81]	Poor
14. Nature	Frequency	45	86320	.40 [.21;.59]	Fair	36	76000	.48 [.27;.70]	Fair	58	1311120	.57 [.42;.72]	Moderate	18	11100	.09 [-.19;.37]	Poor
	Expected effect	44	4411	.17 [-.13;.46]	Poor	29	371	.33 [.02;.65]	Poor	52	6109	.39 [.16;.61]	Fair	18	013	-.27 [-.74;.2]	Poor
15. Faith and meaning	Frequency	45	165300	.75 [.66;.85]	Good	36	44410	.45 [.25;.66]	Fair	58	168210	.61 [.48;.75]	Moderate	18	31300	.65 [.49;.81]	Moderate
	Expected effect	42	1542	.32 [.08;.57]	Poor	30	581	.38 [.11;.66]	Poor	51	16103	.43 [.22;.64]	Fair	16	310	.01 [-.38;.39]	Poor
16. Doing something for someone else	Frequency	45	126211	.57 [.40;.73]	Moderate	36	113000	.55 [.36;.74]	Fair	58	196111	.60 [.46;.74]	Moderate	18	23100	.50 [.28;.73]	Fair
	Expected effect	45	1362	.29 [.04;.54]	Poor	27	963	.60 [.34;.87]	Fair	49	15104	.46 [.23;.68]	Fair	18	510	.19 [-.19;.58]	Poor
17. Security and warmth	Frequency	45	09131	.45 [.27;.62]	Fair	36	35111	.30 [.06;.54]	Poor	58	311231	.45 [.29;.61]	Fair	18	02011	.29 [.01;.57]	Poor
	Expected effect	44	088	.27 [-.01;.55]	Poor	32	296	.63 [.42;.84]	Moderate	54	21512	.58 [.39;.76]	Moderate	18	012	.13 [-.31;.57]	Poor
18. Positive attitude	Frequency	45	00373	.53 [.39;.66]	Moderate	36	01311	.32 [.14;.50]	Poor	58	01462	.42 [.29;.56]	Fair	18	00112	.42 [.18;.65]	Fair
	Expected effect	45	01315	.81 [.71;.91]	Good	36	0511	.70 [.56;.84]	Moderate	58	01219	.74 [.63;.85]	Good	18	055	.81 [.70;.92]	Good

Note. AIM-C = Actions to Improve Mood by Caregivers, N = Valid number of caregiver pairs, CI = Confidence Interval, GDS = Global Deterioration Scale

[a]Altman's benchmarking 5-point scale ranging from "poor" to "very good" was used to interpret the magnitude of the AC2 coefficients. A cumulative probability of above .95 was applied to determine the lowest expected agreement level

Chapter 6

Measuring implicit associations with behaviors to improve resident mood: development of implicit association tasks for nursing home care providers

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Inge A.H. Knippenberg
Ruslan Leontjevas
Ine J.N. Declercq
Jacques J.D.M. van Lankveld
Debby L. Gerritsen

Abstract

Objective: To develop and evaluate instruments for measuring implicit associations of nursing home care providers with behaviors aimed at improving resident mood.

Method: Study 1 (N = 41) followed an iterative approach to develop two implicit association tasks measuring implicit attitude (positive versus negative valence) and motivation (wanting versus not wanting) regarding mood-improving behaviors, followed by an evaluation of the content validity for target stimuli representing these behaviors. In Study 2 (N = 230), the tasks were assessed for stimulus classification ease (accuracy and speed) and internal consistency. A subsample (n = 111) completed additional questionnaires to evaluate convergent validity (with self-reported attitudes towards depression, altruism, and mood-improving behaviors), and discriminant validity (against social desirability), and repeated the tasks after 2 weeks to assess test-retest reliability.

Results: Content validity indexes for target stimuli were satisfactory. Error rates were acceptable for attribute stimuli, but exceeded the 10% limit for target stimuli. Response times for all stimuli exceeded the 800-millisecond threshold. Both tasks demonstrated good internal consistency but poor test-retest reliability. Regarding convergent validity, both tasks significantly correlated with altruism, the implicit attitude task associated with self-reported mood-improving behaviors, and the implicit motivation task correlated with the behavioral scale of attitudes towards depression. Discriminant validity was supported as neither task was significantly associated with social desirability.

Conclusions: The implicit association tasks show potential for measuring implicit associations with mood-improving behaviors of care providers, offering an innovative pathway for exploring processes influencing caregiving behaviors. However, limitations in psychometric properties were identified, aligning with challenges observed in similar measures.

Introduction

A nursing home offers a residential environment that provides functional support and care for individuals who need assistance with daily activities and who often have complex healthcare needs (Sanford et al., 2015). Within this environment, the role of professional nursing home care providers is paramount. Through their regular interaction with residents, care providers become an integral part of resident daily lives, potentially influencing resident mood and psychological well-being (Haugan et al., 2013; Lee et al., 2017). Addressing resident mood is important because a depressed mood affects a substantial portion of nursing home residents and is associated with reduced quality of life and increased mortality (Gilman et al., 2017; Sivertsen et al., 2015; Van Asch et al., 2013). While formal treatments such as antidepressant medication and psychotherapeutic interventions are important (Burley et al., 2022; Declercq et al., 2024), informal approaches may also contribute to supporting resident emotional well-being (Knippenberg et al., 2022). Although not categorized as formal therapeutic interventions, specific care provider behaviors can influence resident mood. For example, behaviors such as paying personal attention and fostering meaningful connections have been shown to positively affect the mood of residents (Haunch et al., 2023; Meeks & Looney, 2011). However, little is known about the automatic cognitive processes guiding these behaviors. Automatic cognitive processes refer to mental operations that occur rapidly and effortlessly, often beyond conscious awareness (Schneider & Chein, 2003). Shaped by past experiences and social influences, these processes impact routine actions and habits and contribute to the formation of preferences, thereby influencing behavior (Aarts & Dijksterhuis, 2000; Ajzen & Fishbein, 2000). Exploring the automatic cognitive processes involved in care provider behaviors could provide novel insights into improving resident mood (Ferguson & Bargh, 2004).

Psychological theories, such as the integrated behavioral model emphasize the role of behavioral intentions in predicting and understanding behaviors (Montano & Kasprzyk, 2015). Attitudes towards specific behaviors are important determinants of these intentions, with contrasting evaluations (e.g., positive or negative, liking or disliking, good or bad) fostering either approach or avoidance behaviors (Elliot, 2013). At the level of automatic cognitive processing, these evaluations can be measured as implicit associations with the target of interest, reflecting the strength of the underlying connection (i.e., the implicit evaluation of the target) (Greenwald et al., 2002). While explicit evaluations can be measured via direct instruments (e.g., questionnaires or interviews), implicit evaluations require alternative approaches. Indirect instruments, such as the implicit association task and the implicit relational assessment procedure, offer promising methods for measuring these implicit evaluations (Bar-Anan & Nosek, 2014; Brownstein et al., 2019; Goodall, 2011). These instruments assess the strength of automatic associations by analyzing behavioral response patterns. Faster responses to

one pair of stimuli (e.g., positive attributes paired with an object) compared to another pair (e.g., negative attributes paired with the same object) indicate a stronger implicit association in memory between the object and a positive evaluation (Brownstein et al., 2019; De Houwer et al., 2009).

Previous researchers within the caregiving context have investigated implicit evaluations concerning various topics, such as depression (Kashihara & Sakamoto, 2018; Monteith & Pettit, 2011), dementia (Kane et al., 2020), and older adults (Liao et al., 2023; Maximiano-Barreto et al., 2019). However, these researchers have not specifically targeted the measurement of implicit evaluations of care provider behaviors associated with these topics. This is relevant because evaluations of behavior (e.g., liking or disliking mood-improving behaviors) tend to be more predictive of behavior occurrence than evaluations of the topic or object to which the behavior is directed (e.g., a positive or negative evaluation of individuals with depression) (Ajzen et al., 2018).

In addition to implicit evaluations, exploring implicit motivations for behavior (e.g., wanting or not wanting to pursue mood-improving behaviors) is important, as implicit motivation may have an even more profound influence on actual behavior than implicit evaluations do (Meissner et al., 2019; Tibboel et al., 2015). Investigating nursing home care provider implicit attitude and motivation regarding behaviors to improve resident mood could, therefore, offer valuable insights into underlying processes guiding caregiving actions. This understanding could inform daily practice and aid in the development of more effective interventions to enhance resident mood. To achieve this, appropriate measurement instruments are needed.

Therefore, with this study, we aimed to develop implicit association tasks for measuring nursing home care provider implicit attitude (positive versus negative valence) toward mood-improving behaviors for residents, as well as their implicit motivation (wanting versus not wanting) for these behaviors. Additionally, we evaluated the psychometric properties of these tasks. With these instruments, we could enable future researchers to evaluate how care provider automatic cognitive processes may influence their behaviors, providing insight for improving resident mood in nursing homes.

General Methods

Overview of the studies

Study 1 involved developing two computer-based implicit association tasks to measure implicit associations of nursing home care providers with behaviors to improve resident mood. The first, the ‘Valence towards Behaviors to improve resident Mood Implicit Association Task’, aimed to measure implicit attitude (positive versus

negative valence) towards mood-improving behaviors. The second, the ‘Motivation for Behaviors to improve resident Mood Implicit Association Task’, focused on measuring implicit motivation (wanting versus not wanting) associated with these behaviors. For these tasks, pictorial target stimuli were created, representing behaviors performed by nursing home care providers aimed at improving resident mood. Additionally, three vignettes reflecting various resident mood states were developed as priming stimuli prior to the tasks. The purpose of using these priming vignettes was based on another study (Knippenberg et al., 2024a), which aimed to explore whether resident mood influenced care provider implicit attitude and motivation regarding behaviors to improve resident mood. Study 1 concluded with an evaluation of the content validity of the proposed target stimuli.

Study 2 focused on assessing the psychometric properties of the developed implicit association tasks. This included evaluating the ease of stimulus classification, internal consistency, test-retest reliability, and convergent and discriminant validity.

Ethics statement

This project followed the guidelines established by the Radboudumc Ethics Committee, which deemed it to be outside the scope of the Medical Research Involving Human Subjects Act (reference number: 2021-11047). The research was conducted in accordance with Dutch legislation and the principles outlined in the Declaration of Helsinki (World Medical Association, 2013). Prior to their involvement, participants were fully informed about the study’s objectives and procedures, and their informed consent was obtained. The participants in Study 2 were rewarded with a 15 euro gift card.

Study 1: Development process and content validity

Methods

Design, procedure, and materials

Study 1 comprised two sequential phases. Phase 1 involved the development of the ‘Valence towards Behaviors to improve resident Mood Implicit Association Task’ (implicit attitude task) and the ‘Motivation for Behaviors to improve resident Mood Implicit Association Task’ (implicit motivation task), including the creation of target stimuli reflecting mood-improving behaviors. Care providers evaluated the initial target stimuli through an online questionnaire. Their feedback was deliberated upon by the research team, leading to refinements and the final selection of target stimuli. Subsequently, in Phase 2, care providers evaluated the content validity of the selected target stimuli through an online questionnaire.

Phase 1: Development of the implicit association tasks. An iterative approach was followed for creating the implicit association tasks, adhering to the guidelines outlined by Greenwald et al. (2022) and incorporating feedback from stakeholders. Given the absence of a counterpart for the target category (mood-improving behaviors), a single-category variant was chosen (Karpinski & Steinman, 2006). Consequently, each task was structured into five blocks (**Table 1**). To familiarize participants with the procedure, the task started with a practice block (Block 1), exclusively involving stimuli and labels from the attribute categories. Subsequent blocks contained both target and attribute stimuli and labels. Blocks 2 (practice) and 3 (test) combined target stimuli with the same response key as stimuli from one attribute category (e.g., 'positive'), while Blocks 4 and 5 mapped target stimuli to the other attribute category (i.e., 'negative').

Table 1. Sequence of trial blocks in the implicit association tasks.

Block	Function	No. of trials	Stimuli assigned to left-key response (n)	Stimuli assigned to right-key response (n)
1	Attribute practice	16	Positive images[a] (8)	Negative images[b] (8)
-	Vignette presentation[c]			
2	Attribute /target practice	32	Positive images (8) & Images representing mood-improving behaviors of care providers for nursing home residents (8)	Negative images (16)
3	Attribute /target test	64	Positive images (16) & Images representing mood-improving behaviors of care providers for nursing home residents (16)	Negative images (32)
-	Vignette presentation			
4	Attribute /target practice	32	Positive images (16)	Negative images (8) & Images representing mood-improving behaviors of care providers for nursing home residents (8)
5	Attribute /target test	64	Positive images (32)	Negative images (16) & Images representing mood-improving behaviors of care providers for nursing home residents (16)

Note. For half the subjects, the positions of Blocks 2 and 3 are switched with those of Blocks 4 and 5, respectively.
[a]Positive images represented positive attitude (valence) and motivation (wanting).
[b]Negative images reflected negative attitude (valence) and demotivation (not wanting).
[c]During the implicit association task, participants were primed with one of three vignettes, randomly assigned to each participant. Each vignette was presented twice during the task. The type of vignette maintained consistent across all assessments.
n = number of stimuli assigned to the key response.

In both tasks, the target category was labelled "do something" (in Dutch: "*lets doen*"). For attribute categories, the implicit attitude task used the labels "positive" ("*positief*") versus "negative" ("*negatief*"), while the implicit motivation task employed the labels "I want" ("*wil ik graag*") versus "I do not want" ("*wil ik niet graag*"). Target and attribute labels were prominently displayed in the upper-left and upper-right corners of the screen, corresponding to the block.

The stimuli were presented in the center of the screen, with a 150-millisecond interval following each correct response. Participants were instructed to categorize the stimuli on the basis of the displayed labels by using the left ('E') or right ('I') computer keys. For example, when presented with a target stimulus, participants were instructed to press the key associated with the label "do something." To minimize response bias, an equal number of left and right keyboard strikes were required, with stimuli from the attribute category that were not associated with the target category appearing twice as frequently (Greenwald et al., 2022). Upon an incorrect response, a red X appeared in the center of the screen until the correct key was pressed. Within the test blocks (Blocks 3 and 5), each stimulus was presented at least twice to ensure a sufficient number of responses (Greenwald et al., 2022).

Stimulus Selection. In selecting stimuli for the implicit tasks, images were preferred over textual prompts, given their demonstrated validity (Hogenboom et al., 2023). We aimed to select between four and eight stimuli per category to strike a balance between maintaining a concise task administration and ensuring comprehensive coverage of the target construct.

The attribute stimuli were selected from the International Affective Picture System (Lang et al., 2008). Half of these stimuli were required to possess normative valence scores exceeding 6 on a 9-point scale, representing positive attitude (valence) and motivation (wanting). Conversely, the remaining half of the stimuli were selected to have low valence scores, falling below 4 on the scale, reflecting negative attitude (valence) and demotivation (not wanting). In addition, arousal levels, thematic content, and color usage of the stimuli were carefully balanced to ensure similarity between positively valenced (motivation) and negatively valenced (demotivation) stimuli. Further criteria for the attribute stimuli included the absence of human actions to prevent overlap with target stimuli, and the exclusion of gruesome or shocking themes (e.g., images of dead animals) as judged by the research team.

Target stimuli illustrating nursing home care provider behaviors aimed at improving resident mood were specifically developed for these implicit tasks. Based on input from the research team, a graphic designer created 12 images representing various mood-improving behaviors. These images were informed by a Group Concept Mapping Study (Knippenberg et al., 2022), in which nursing home residents, relatives, and care

providers brainstormed and clustered strategies for improving resident mood. Follow-up research (Knippenberg et al., 2024b) identified 18 main themes (e.g., contact with others, music, and physical activity), which were reflected in the designed images. Care providers then evaluated these images for their initial impressions, relevance in improving resident mood, and recognizability in daily practice through an online questionnaire administered via LimeSurvey (LimeSurvey Project Team and Schmitz, 2015). The questionnaire included both open-ended questions (e.g., "What are your first thoughts when you look at this image?") and closed-ended questions (e.g., "To what extent does this image illustrate a recognizable situation in practice?" with a 5-point scale ranging from "not at all" to "completely"). Additionally, each care provider selected six images that they believed most accurately depicted mood-improving behaviors by care providers in nursing homes. Subsequently, the research team deliberated upon care provider feedback on the images, leading to refinements and a final selection of target stimuli representing mood-improving behaviors in nursing homes (https://osf.io/ywdjq/).

Phase 2: Evaluation of the content validity of the target stimuli. The content validity of the selected target stimuli was assessed through an online questionnaire (LimeSurvey Project Team and Schmitz, 2015). Care providers rated the relevance of each image in improving resident mood via the options "not relevant," "somewhat relevant," "quite relevant," and "highly relevant." Additionally, by selecting "yes," "no" or "don't know," care providers indicated whether the predefined themes relevant to mood-improving behaviors (e.g., contact with others, music, and physical activity) were represented by the images.

Participants and setting

The study included care providers actively engaged in caregiving tasks within Dutch nursing homes under a financial employment relationship (i.e., registered nurses [RNs], certified nurse assistants, and nurse assistants). A convenience sample was drawn from care providers who had previously participated in a related study (Knippenberg et al., 2024b). These care providers contributed to selecting and refining target stimuli in Phase 1 and to assessing the content validity of the final target stimuli in Phase 2.

Analysis

To analyze the qualitative data concerning the selection and refinement of the target stimuli, thematic analysis (Braun & Clarke, 2006) was conducted using ATLAS.ti 9 (ATLAS.ti Scientific Software Development GmbH, 2023). Descriptive statistics and calculation of the content validity index for the selected target stimuli were performed using IBM SPSS 27 (IBM Corporation., 2013). The content validity index ranges from .00 to 1.00, with a threshold of at least .78 generally considered satisfactory (Polit et al., 2007). To evaluate how well the predefined themes regarding mood-improving behaviors were reflected by the selected target stimuli, the research team set the

criterion that at least one stimulus for each theme should be rated as representative by at least 80% of participants.

Results

Participants

A total of 41 nursing home care providers (five nurse assistants, 20 certified nurse assistants, and 16 RNs) participated in the selection and refinement of the target stimuli. The mean age of the participants was 45.0 years (Standard Deviation [SD] = 13.2), with the majority being female (Number of cases in the subsample [*n*] = 37, 90.2%). In the evaluation phase regarding the content validity of the selected target stimuli, 35 care providers (85.4% of the total, 32 females), took part. These care providers had an average age of 43.3 years (SD = 12.6).

Stimuli selection and content validity

The selection process resulted in eight positive (wanting) and eight negative (not wanting) attribute stimuli, along with eight target stimuli (Supplementary material – Table A and https://osf.io/ywdjq/). For the attribute stimuli, the mean valence score was 7.4 (SD = 1.5) for positive stimuli and 3.4 (SD = 1.6) for negative stimuli. The average arousal scores were 4.8 (SD = 2.4) and 4.9 (SD = 2.1), respectively. The content validity index of the selected target stimuli ranged from .85 to .97 (Supplementary material – Table A). Except for the theme "Faith and meaning," all themes were represented by at least one target stimulus (Supplementary material – Table B). Most of the themes were represented by either one or two target stimuli. Notably, three themes were reflected in (almost) all target stimuli: "Stimulating the senses," "Contact with others," and "Positive attitude."

Study 2: Psychometric evaluation

Methods

Design and procedure

Study 2 was designed to examine the psychometric properties of the implicit attitude and the implicit motivation task (https://osf.io/ywdjq/). Participants completed online questionnaires to evaluate their self-reported attitudes towards depression, altruistic tendencies, social desirability proneness, and mood-improving behaviors, with the aim of evaluating the convergent and discriminant validity of the implicit tasks. In addition, they performed several computer-based reaction tasks: alongside completing the implicit attitude and the implicit motivation task, participants performed a Simon task (Simon, 1990).

The psychometric evaluation of the implicit attitude and the implicit motivation task focused on ease of stimulus classification (accuracy and speed), internal consistency, test-retest reliability (measured after a 2-week follow-up period), convergent validity (with self-reported attitudes towards depression, altruism, and mood-improving behaviors), and discriminant validity (against social desirability). Test-retest reliability, convergent validity, and discriminant validity were evaluated in a random subsample of participants, comprising half of the total sample.

All participants provided demographic information and completed both implicit tasks. To account for potential order effects, participants were randomly assigned to start with the implicit attitude or the implicit motivation task. The sequence of blocks within each task was also counterbalanced, with half of the participants starting with the hypothesis-consistent sequence (where the target stimuli shared the response key with "positive" and "I want" stimuli) and the remaining half with the hypothesis-inconsistent sequence (where the target stimuli shared the response key with "negative" and "I do not want" stimuli). The assigned sequence of blocks within the task remained consistent across both tasks. A Simon task was administered between task administrations to minimize potential carry-over effects from previous questions and tasks (Kiesel et al., 2010).

Additionally, after providing demographic information, half of the participants completed a baseline questionnaire to assess their self-reported attitudes towards depression, altruism, and social desirability proneness, followed by a Simon task. After completing both implicit tasks with a Simon task in-between, participants in the subsample repeated the Simon task and completed a questionnaire about mood-improving behaviors at the end of the baseline measure. Using a repeated-measures design with a 14-day interval between assessments, as recommended by Terwee et al. (2007), this subsample of participants completed the questionnaire about their attitudes towards depression again, as well as both the implicit attitude and the implicit motivation task during a follow-up measure. A Simon task preceded each implicit task administration. The repeated administration of the questionnaire measuring attitudes towards depression was necessitated by the unavailability of test-retest reliability data for the instrument. The sequence within the task (starting with hypothesis-consistent or hypothesis-inconsistent blocks) and the order of the tasks (implicit attitude or implicit motivation task first) remained consistent across all measurements.

Participants and setting

Care providers with a financial employment relationship and who actively engaged in caregiving tasks within a Dutch nursing home were eligible to participate. While recruitment specifically targeted RNs and certified nurse assistants, other caregiving staff, such as nurse assistants, were also included. Recruitment involved

contacting a random 5% sample of nursing homes in the Netherlands listed on "ZorgkaartNederland" (2023). These facilities were contacted via telephone and asked to distribute research invitations by email to their care staff who met the eligibility criteria. Participation took place online, requiring participants to use a laptop or computer with a keyboard. Participants were allowed to choose their preferred location for study participation, provided that the chosen setting was minimally distracting. Notably, while the subsample completed a 2-week follow-up measure, the remaining participants were invited to take part in another study (Knippenberg et al., 2024a).

Materials

Measuring equipment and software. We used the O4U platform (Slot, 2023), which facilitates the integration of computer-based tasks and online questionnaire administration. Lab.js (Henninger et al., 2022), an online open-source experiment builder, was used for constructing the reaction tasks (i.e., the implicit tasks and the Simon task), while LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) was employed for questionnaire administration.

Reaction tasks. The 'Valence towards Behaviors to improve resident Mood Implicit Association Task' and the 'Motivation for Behaviors to improve resident Mood Implicit Association Task' were used to assess nursing home care providers' implicit attitude and motivation, respectively, related to mood-improving behaviors for residents. Detailed descriptions of these tasks can be found in the methods and results sections of Study 1. Following Greenwald et al.'s (2022) guidelines, D-values for both tasks were computed using the algorithm with a built-in error penalty procedure. The D-value represents the standardized difference in response latencies between contrasted conditions, calculated as the mean difference in response times dived by the pooled standard deviation of latencies across conditions (Greenwald et al., 2022). Data from Blocks 2 through 5 were used for this computation. Trials that exceeded 10,000 milliseconds, constituting a mere 0.09% of all trials, were removed. Data from participants with more than 10% of the remaining trials displaying latencies less than 300 milliseconds were likewise excluded (n = 1 participant) (Greenwald et al., 2022). D-values from implicit association tasks range from -2 (indicating a negative implicit attitude or motivation toward mood-improving behaviors) to +2 (reflecting a positive implicit attitude or motivation).

In this study, the Simon task (Simon, 1990) served as a wash-out task between the implicit task assessments and following the additional baseline questionnaire in the subsample. In this task, participants were presented with sequences of blue and green circles that randomly appeared on either the left or right side of the screen. Participants were instructed to respond to the color of the stimulus ('E' key for blue, 'I' for green) while disregarding its position. The task was completed in approximately 3 minutes.

Questionnaire. All participants provided demographic information (i.e., sex, age, professional function, years of working experience, type of ward, and regularity of their involvement in the care of residents with depression). Additionally, the participants in the subsample completed questionnaires to evaluate their self-reported attitudes towards depression, altruistic tendencies, social desirability proneness, and mood-improving behaviors.

To evaluate care provider attitudes towards nursing home residents with depression, the Nijmegen Depression Attitude Scale (Raap et al., 2010) was used. This scale consists of three subscales: knowledge (eight items), behavior (four items), and affect (three items). Sample items include "Medication is the best way to treat depression in nursing home residents" (a reverse item from the knowledge subscale) and "With residents with depression, I often feel like I cannot accomplish anything" (a reverse item from the affect subscale). The responses are recorded on a 5-point scale ranging from "totally disagree" to "totally agree." In the current sample (n = 111), the Cronbach's alpha coefficients (α) for these three subscales were deemed acceptable (α = .73, .66, and .76, respectively). Furthermore, the intraclass correlation coefficient (ICC) (2-way random effects, absolute agreement, single measure) indicated satisfactory test-retest consistency (n = 94, ICC = .75 [95% Confidence Interval = .64; .82], .68 [.55; .77], and .78 [.69; .85], $p < .001$).

Altruistic tendencies were assessed using a validated Dutch translation of the NEO Five-Factor Inventory-3 Altruism scale (Hoekstra et al., 2007; McCrae & Costa Jr, 2007). This scale is a concise version of the NEO Personality Inventory (Costa & McCrae, 1992), designed to measure personality traits. The altruism scale comprises 12 items, rated on a scale ranging from 1 (totally disagree) to 5 (totally agree). An example item is "In general, I try to be thoughtful and caring." The Cronbach's alpha coefficient for the altruism scale in this study was .85.

Social desirability was evaluated using a Dutch adaptation of the Social Desirability scale from the Eysenck Personality Questionnaire Revised Short Scale (Eysenck & Eysenck, 1991; Sanderman et al., 1991). This validated scale includes 12 items, such as "Are all your habits good and desirable?", with response options of "yes" or "no." In the current sample, the Cronbach's alpha coefficient of the scale was .75.

Mood-improving behaviors were assessed using the Actions to Improve Mood by Caregivers inventory (Knippenberg et al., 2024b). This inventory is specifically designed to measure actions initiated by nursing home care providers to improve the mood of residents. The inventory covers 18 themes (e.g., physical activity, contact with others, music), each accompanied by a brief description and examples of potential actions. Following this, each theme includes two items. The first item pertains to the frequency of the action—for example, "As for encouraging physical activity, how often do you

or your colleagues do this in an average week?" Responses are recorded on a 5-point scale ranging from "never" to "very often." The second item focuses on the anticipated effect of the action on the resident's mood—for example, "If you do (or would do) this, does this make the resident feel happy?" Responses to this item are categorized into "no," "yes, a bit happy," and "yes, very happy."

Items across all scales were recoded when necessary. For each scale, except the Actions to Improve Mood by Caregivers inventory, average scores were calculated following the scale's guidelines, where higher scores indicate a higher degree of the respective trait or characteristic. For the Actions to Improve Mood by Caregivers inventory, an interaction score was computed for each theme by multiplying the frequency and anticipated effect ratings. These scores for individual themes were then averaged, offering an overarching measure of the frequency of mood-improving behaviors while taking their anticipated effect into account.

Analysis

Point-biserial correlation and Pearson correlation analyses were conducted to explore the associations between demographic variables with the implicit attitude and the implicit motivation task at baseline. This exploration aided in determining the potential inclusion of covariates in subsequent analyses. Additionally, the correlation between the two implicit tasks was examined using Pearson correlation analysis.

Order effects were assessed by performing a factorial Analysis of Variance (ANOVA) for each implicit task. This analysis investigated the influence of the block order within each task (whether hypothesis-consistent or hypothesis-inconsistent blocks were presented first), between tasks (implicit attitude or implicit motivation task presented first), and the interaction effect of order within and between tasks on implicit attitude and motivation. In the case of a significant order effect, sensitivity analyses are performed to correct for this, using the respective order effect as a factor.

The ease of stimulus classification, for both the attribute and target stimuli, was evaluated by computing the percentage of false responses (error rates) and the mean latency (speed) during the initial presentation of each stimulus. This analysis included data from Block 1 for the attribute stimuli and Block 2 (or Block 4 in case of an alternate order) for the target stimuli in the first presented implicit task. Findings were compared against the accuracy (< 10% errors) and speed (response latencies < 800 millisecond) cut-off criteria proposed by Greenwald et al. (2022).

The internal consistency of the implicit tasks at baseline was assessed using the split-half reliability method with the odd-even technique and corrected for attenuation using the Spearman-Brown formula (Cohen et al., 2014). Reliability coefficients were calculated separately for practice trials, test trials, and a combination of both. Test-

retest reliabilities between the implicit tasks' D-value at baseline and the 2-week follow-up were evaluated using ICC (2-way random effects, consistency, single measure). To interpret the results, these findings were compared to previously reported meta-analytic coefficients for internal consistency (α = .76, N = 33 studies) and test-retest reliability (r = .25, N = 7 studies) of single-category implicit association tasks, as documented by Greenwald and Lai (2020).

Mixed model analyses were conducted to examine the convergent validity of the implicit tasks. Models were built for the tasks' D-values with fixed effects of self-reported attitudes toward depression, altruism, and mood-improving behaviors. Discriminant validity of the tasks was assessed using mixed models with fixed effects of self-reported social desirability. Separate models were constructed for both the implicit attitude and the implicit motivation task. Prior to analyses, all variables were standardized. To interpret these results, we drew upon the findings from a meta-analysis comprising 81 studies exploring the associations between implicit association tasks and explicit self-report measures, revealing an overall effect size of .24 (Hofmann et al., 2005).

Sample size calculations were conducted for the primary analyses of this study: test-retest reliability and convergent validity. A power level of .80 and a significance level of .05 were used. The R package "ICC.Sample.Size" (Rathbone et al., 2015) was employed to determine the required sample size for calculating the ICC. With an anticipated correlation of .25, as reported in the meta-analysis conducted by Greenwald and Lai (2020), the sample size calculation indicated that 122 participants would be necessary. Additionally, G*Power 3 (Faul et al., 2007) was used to estimate the optimal sample size for evaluating convergent validity. Based on an effect size of .20, the analysis indicated a sample size of 42 participants.

Results

Participants

Table 2 provides an overview of the demographics of the study participants. Data from participants who completed at least the first implicit task were used in the analysis to evaluate stimulus classification ease and internal consistency. Concerning the order of implicit task administration, 122 participants (53.0%) started with the implicit attitude task, while the remainder began with the implicit motivation task. With respect to the sequence within each task, 122 participants (53.0%) started with the hypothesis-consistent blocks.

Table 2. Demographic characteristics of care providers for Study 2.

	Initial sample	Subsample	
	Baseline	Baseline	2-week follow up
N	230	111	91
Sex, female, N (%) / male, n	208 (91.2) / 20	102 (91.9) / 9	83 (91.2) / 8
Age, mean, (SD) [range]	41.6 (12.7) [18-66]	41.8 (12.4) [19-66]	41.0 (12.5) [19-66]
Type of care provider, n (%)			
Registered nurse	94 (41.0)	42 (37.8)	41 (45.1)
Certified nurse assistant	115 (50.2)	58 (52.3)	44 (48.4)
Nurse assistant / nurse aide	16 (7.0)	9 (8.1)	4 (4.4)
Other	4 (1.7)	2 (1.8)	2 (2.2)
Years of working experience, mean (SD) [range]	11.4 (11.0) [0-43]	10.8 (10.3) [0-38]	9.9 (9.5) [0-37]
Type of ward employment[a], yes n (%) / no, n			
Medical-somatic care	117 (51.1) / 112	60 (54.1) / 51	51 (56.0) / 40
Psychogeriatric care	153 (66.8) / 76	78 (70.3) / 33	61 (67.0) / 30
Mental-physical multimorbidity care	20 (8.7) / 209	10 (9.0) / 101	7 (7.7) / 84
Other	15 (6.6) / 214	6 (5.4) / 105	6 (6.6) / 85
Regularity of involvement in the care of residents with depression, n (%)			
Never	0 (0.0)	0 (0.0)	0 (0.0)
Occasionally	78 (34.1)	42 (37.8)	38 (41.8)
Regularly	113 (49.3)	51 (45.9)	36 (39.6)
Often	29 (12.7)	13 (11.7)	13 (14.3)
Very often	9 (3.9)	5 (4.5)	4 (4.4)

Note. Valid percentages are shown.
[a]The percentages for type of ward employment do not sum to 100% because individuals may work in multiple wards.
N = Total sample size; n = Subsample size; SD = Standard Deviation.

Associations between demographic characteristics and the implicit association tasks

Correlation analysis revealed no significant correlations between demographic characteristics and either the implicit attitude or implicit motivation task (coefficients ranging from -.02 to .09, $p > .05$). Consequently, demographic characteristics were not included as covariates in subsequent analyses. A significant weak positive correlation was observed between the implicit attitude task and the implicit motivation task ($r = .24$ [95% Confidence Interval: .11 to .36], $p < .001$).

Order effects

Concerning the D-values for implicit attitude as measured with the implicit attitude task, a significant interaction effect (between tasks x within task sequence) related to order was found ($F(1, 223) = 4.56$, $p = .034$, $\eta^2 = .02$). For the 'implicit attitude task first' condition, D-values for implicit attitude were lower when participants were initially presented with hypothesis-consistent blocks (Mean [M] = .20, SD = .25) than when they were first presented with hypothesis-inconsistent blocks (M = .29, SD = .24), while the reverse pattern was noted for the 'implicit motivation task first' condition (M = .22, SD = .19; M = .18, SD = .24, respectively).

In terms of implicit motivation (as measured with the implicit motivation task), a significant main order effect between task administrations was detected ($F(1, 220) = 18.73$, $p < .001$, $\eta^2 = .08$). Participants displayed higher D-values for implicit motivation when the implicit motivation task was presented first (M = .28, SD = .26) than when the implicit attitude task was presented first (M = .14, SD = .22). No other significant order effects were observed for either implicit attitude or implicit motivation ($p > .05$).

Stimulus classification ease

The analyses for accuracy of stimulus classification indicated a mean error rate of 4.0% for attribute stimuli and 12.4% for target stimuli (Supplementary material – Table A). All stimuli displayed prolonged response times exceeding the desirable 800-millisecond threshold, with mean latencies of 1118.2 milliseconds (SD = 749.9) for attribute stimuli and 1299.7 milliseconds (SD = 1075.7) for target stimuli. Notably, the attribute stimulus 'Galaxy' stood out because of its high error rate (24.9%) compared with the other stimuli.

Internal consistency and test-retest reliability

Both implicit tasks demonstrated acceptable split-half reliability coefficients for the practice trials (implicit attitude task: $r_{sb} = .66$; and implicit motivation task: $r_{sb} = .81$), test trials ($r_{sb} = .84$; .77), and for the combined practice and test trials ($r_{sb} = .81$; .85). Additionally, ICCs revealed a significant yet poor level of test-retest reliability for the implicit attitude (ICC = .29 [95% Confidence Interval: .10 to .47], $p = .002$) and the implicit motivation task (.25 [.04 to .43], $p = .009$).

Convergent and discriminant validity

Mixed model analyses (**Table 3**) showed significant associations between self-reported altruism and both the implicit attitude and the implicit motivation task. Furthermore, the behavioral subscale of the Nijmegen Depression Attitude Scale was significantly related to the implicit motivation task, but not to the implicit attitude task. Conversely, the Actions to Improve Mood by Caregivers inventory showed a significant association with the implicit attitude task, but not with the implicit motivation task. Neither the

knowledge subscale nor the affect subscale of the Nijmegen Depression Attitude Scale was significantly related to either the implicit attitude or the implicit motivation task.

Regarding discriminant validity, the analysis revealed that social desirability was not related to either the implicit attitude or the implicit motivation task. Subsequent sensitivity analyses, with correction for order effects, yielded comparable results.

Table 3. Fixed effect estimates of self-reported attitudes towards depression, altruism, mood-improving behaviors, and social desirability with the implicit attitude and implicit motivation task.

	VBM-IAT, n = 110			MBM-IAT, n = 109		
Parameter	**Estimate (SE)**	**95% CI**	***p*-value**	**Estimate (SE)**	**95% CI**	***p*-value**
NDAS – Knowledge	.04 (.09)	[-.14, .22]	.673	.18 (.09)	[-.00,.36]	.052
NDAS – Behavior	-.02 (.09)	[-.20, .16]	.823	**.21 (.09)**	**[.03, .39]**	**.022***
NDAS – Affect	.10 (.09)	[-.08, .28]	.263	.15 (.09)	[-.03, .33]	.095
NEO-FFI-3 – Altruism	**.28 (.09)**	**[.11, .45]**	**.001*****	**.24 (.09)**	**[.07, .42]**	**.008****
AIM-C	**.20 (.09)**	**[.03, .36]**	**.023***	.12 (.09)	[-.06, .31]	.183
EPQ-RRS – Social desirability	.05 (.09)	[-.13, .23]	.556	.03 (.09)	[-.15, .21]	.735

Note. Individual models were built for each predictor and for each outcome. All variables are standardized. $p < .05$ are in boldface.
*$p < .05$; **$p \leq .01$; ***$p \leq .001$.
VBM-IAT = Valence towards Behaviors to improve resident Mood Implicit Association Task (implicit attitude task); MBM-IAT = Motivation for Behaviors to improve resident Mood Implicit Association Task (implicit motivation task); SE = Standard Error; CI = Confidence Interval; NDAS = Nijmegen Depression Attitude Scale; NEO-FFI-3 = NEO Five-Factor Inventory-3; AIM-C = Actions to Improve Mood by Caregivers inventory; EPQ-RRS = Eysenck Personality Questionnaire – Revised.

General discussion

To facilitate future research on how nursing home care provider automatic cognitive processes may influence their behaviors, we introduced two implicit association tasks designed to measure care provider implicit associations with mood-improving behaviors for residents. Specifically, we developed and evaluated the 'Valence towards Behaviors to improve resident Mood Implicit Association Task' (implicit attitude task) and the 'Motivation for Behaviors to improve resident Mood Implicit Association Task' (implicit motivation task). The implicit attitude task assesses implicit attitude (positive versus negative valence) towards mood-improving behaviors, while the implicit motivation task measures implicit motivation (wanting versus not wanting) for these behaviors. The target stimuli were designed specifically for these tasks, representing nursing home care provider behaviors aimed at improving resident mood.

The content validity analysis confirmed that the selected target stimuli are appropriate for depicting care provider behaviors aimed at improving resident mood. However, it is important to consider that the representation of mood-improving behaviors may vary across different themes. The themes “stimulating the senses,” “contact with others,” and “positive attitude” seem to be prominently featured in the stimuli, whereas “faith and meaning” appears to be less prevalent. This variation is not necessarily problematic, as it plausibly reflects actual care provider behaviors, with the prominent themes potentially being more frequently applied in caregiving practices (Knippenberg et al., 2022). Nevertheless, it is important to take this variation in represented themes into account when these tasks are used, as they offer valuable insights into the topic being measured.

Regarding the ease of stimulus classification, acceptable error rates were observed for attribute stimuli (representing positive or negative valence, and motivation or demotivation), but slightly higher rates than those deemed acceptable were noted for the target stimuli. This variation could be ascribed to differing presentation contexts: attribute stimuli were presented in a block that consists solely of attribute stimuli (Block 1), while target stimuli were displayed alongside attribute stimuli within the same block, potentially complicating their categorization. Moreover, the complexity of the target stimuli, which encompassed multiple themes within a single image, may have contributed to a less straightforward interpretation compared to the potentially simpler attribute stimuli, such as a solitary depiction of a fawn (Greenwald et al., 2022).

The prolonged reaction times for all stimuli indicate that participants found them difficult to classify, potentially leading to less accurate measurements of implicit associations (Greenwald et al., 2022). Additionally, the observed high error rate for the ‘Galaxy’ attribute stimulus, sourced from the widely used International Affective Picture System (Lang et al., 2008), emphasizes the need for further exploration of the adequacy of using this stimulus in implicit association tasks. While challenges in stimulus validity are apparent in this study, they align with those identified in previous research (Hogenboom et al., 2023). Nevertheless, these findings indicate the importance of further investigating stimulus validation in implicit association task studies, an aspect that appears to have received limited attention within this field of research.

Both implicit tasks demonstrated good internal consistency, aligning with findings from similar single-category implicit association task studies (Greenwald & Lai, 2020). However, their seemingly poor test-retest reliability, although statistically significant and consistent with previous studies (Greenwald & Lai, 2020), suggests an area for improvement. The higher level of internal consistency compared to test–retest reliability suggests the existence of systematic variance in single task measurements that does not persist across different measurement occasions. In the future, researchers may explore and refine strategies aimed at improving the

temporal consistency of these tasks. One potential approach for improvement could involve controlling environmental factors, for example, by considering exclusive task administration in a controlled environment.

The negligible and insignificant correlation between the implicit tasks and self-reported social desirability supports the tasks’ discriminant validity. We also found partial support for the tasks’ convergent validity, with weak yet positive associations of both tasks with altruism. However, findings regarding convergent validity with other scales are less clear. For example, the behavioral subscale of the Nijmegen Depression Attitude Scale showed a weak positive correlation with the implicit motivation task but not with the implicit attitude task. This finding supports the idea of a closer depiction of a goal-directed motivational state (wanting) measured by the implicit motivation task rather than reflecting a positive valence towards the behavior itself as assessed by the implicit attitude task. This is also in line with prior research indicating that the desire to pursue behaviors may be more closely related to actual behavior than to implicit evaluations of the behavior (Meissner et al., 2019; Tibboel et al., 2015). However, the findings might also be influenced by the attribute labels for valence possibly being more abstract than those used for motivation, as we used general (nonpropositional) “positive” and “negative” labels and not propositional “I like” and “I do not like” as labels for valence. Future researchers may explore propositional (personalized) implicit attitude tasks (using attribute labels “I like” and “I do not like”), as proposed by Olson and Fazio (2004).

Conversely, the implicit attitude task, but not the implicit motivation task, displayed a poor yet positive correlation with the Actions to Improve Mood by Caregivers inventory. Post hoc analysis (not reported) suggested that this discrepancy could be partially ascribed to the anticipated effect of the behavior on resident mood, rather than solely the frequency of the behavior. Unlike the implicit attitude task, the implicit motivation task appears to be unaffected by the expected effect of mood-improving behaviors. This suggests that additional factors, such as prior knowledge regarding the efficacy of the behavior for a specific resident or engaging in behaviors for purposes unrelated to mood improvement (e.g., enhancing physical well-being), may influence implicit motivation. Overall, the small effect sizes observed in these analyses, although consistent with previous implicit association task research (Hofmann et al., 2005), underscore the need for cautious interpretation of these results.

Interestingly, neither the implicit attitude nor the implicit motivation task was significantly related to the knowledge or the affect subscale of the Nijmegen Depression Attitude Scale. Given the homogeneous research sample (i.e., nursing home care providers), it is plausible that the measures used in this study may not have sufficiently differentiated between participants, potentially limiting the variability needed to detect significant relationships (Tabachnick & Fidell, 2007). Future

researchers may benefit from including the general population or other specific target groups to further evaluate the psychometric properties and potential differentiation capabilities of the implicit tasks.

Strengths and limitations

A notable strength of this research lies in the development of implicit association tasks within the field of nursing home care, an area where the use of indirect measurement instruments has been limited. Using such tools holds promise for yielding additional insights into improving resident mood. Particularly noteworthy is the emphasis on behaviors aimed at improving resident mood, rather than merely focusing on resident mood as a topic. This approach aligns with research indicating that evaluating behavior is more predictive of its occurrence than assessing the topic or object to which the behavior is directed (Ajzen et al., 2018). Furthermore, the creation of implicit tasks for both attitude and motivation regarding behaviors facilitates comparative analysis, allowing ongoing research to gain further understanding of the potentially distinct effects associated with each aspect. Moreover, the comprehensive evaluation of the tasks' psychometric properties, including an assessment of content validity for the target stimuli and post hoc validation of all stimuli, represents a noteworthy but uncommon practice in implicit association task research. Nevertheless, while using the implicit tasks can provide additional insights into the underlying mechanisms relative to directly measured behaviors (Roefs et al., 2011), future longitudinal research is needed to explore the predictive value of these tasks for actual behaviors and their combined value with direct measurement instruments.

This study also has limitations that call for consideration. For convergent validity, ideally, instruments measuring 'attitudes towards mood-improving behaviors' and 'willingness for mood-improving behaviors' are used. However, such instruments are not available. Therefore, we selected related instruments that are expected to positively correlate with the constructs of interest. The lack of instruments specifically designed to measure attitude towards and motivation for mood-improving behaviors limits the strength of our convergent validity assessment. Additionally, both the Actions to Improve Mood by Caregivers inventory and Nijmegen Depression Attitude Scale require further validation (Knippenberg et al., 2024b; Raap et al., 2010), underscoring the need for additional research to further validate the implicit association tasks.

Furthermore, the implicit tasks were not evaluated for correlation with an established standard of comparison (i.e., criterion validity) using external criteria such as actual mood-improving behaviors performed by care providers or resident mood. The Actions to Improve Mood by Caregivers inventory, used in this study as a measure for convergent validity, is not suitable as a gold standard for criterion validity because it covers the behaviors of various care providers, while the implicit tasks specifically

target particular care provider actions. Additionally, measuring the mood of nursing home residents was not feasible within the design of the current study. Future researchers could examine the criterion validity of the tasks by correlating the tasks' scores with other measures of care provider behaviors to improve resident mood (e.g., direct observations) or with established measures of resident mood.

Moreover, the use of fictional pictorial illustrations of mood-improving behaviors (target stimuli) in the tasks poses limitations in terms of ecological validity. The selected target stimuli may not fully capture the complexity of real-world scenarios of care provider behaviors in nursing homes. For example, care provider and resident characteristics, factors related to their interaction, and environmental factors may also influence care provider behaviors. Subsequent researchers could address this issue by directly observing care provider interactions in authentic nursing home settings.

In addition, we focused on the behaviors of care providers working in nursing homes, rather than those with a personal relationship with the residents. Exploring implicit associations among caregivers with personal ties to residents could be valuable, as these relationships may influence their attitudes and motivations regarding mood-improving behaviors differently. Adapting the target stimuli and assessing the psychometric properties of implicit association tasks in this context could provide additional insights.

Conclusions

The developed implicit association tasks show promise in measuring nursing home care provider implicit attitude (positive versus negative valence) and motivation (wanting versus not wanting) regarding behaviors to improve resident mood. While limitations in stimulus validity, temporal consistency, and convergent validity of the new instruments were identified – challenges common to similar instruments – these instruments may represent an innovative pathway for future research. By providing insight into how care provider automatic cognitive processes may influence their behaviors, these instruments can contribute to advancing strategies to improve resident mood and caregiving practices in nursing homes.

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Supplementary materials

Table A. Stimuli characteristics.

						Ease of stimulus classification[a], N = 230	
Stimulus	**Description**	**IAPS no.**	**Valence (SD)**	**Arousal (SD)**	**CVI, n = 35**	**Error rate**	**Mean latency in ms (SD)**
Attribute stimuli							
Positive 1	Fawn	1630	7.3 (1.5)	4.5 (2.5)		0.4%	1001.7 (598.6)
Positive 2	Puppies	1710	8.3 (1.1)	5.4 (2.3)		0.0%	969.6 (596.2)
Positive 3	Garden	5202	7.3 (1.4)	3.7 (2.2)		2.2%	909.4 (444.4)
Positive 4	Seaside	5210	8.0 (1.1)	4.6 (2.5)		4.3%	1121.3 (727.2)
Positive 5	Galaxy	5300	6.9 (1.8)	4.4 (2.6)		24.9%	1490.1 (1088.9)
Positive 6	Sea	5825	8.0 (1.2)	5.5 (2.7)		1.7%	1098.1 (764.0)
Positive 7	Cupcakes	7405	7.4 (1.7)	6.3 (2.2)		2.6%	1026.5 (552.0)
Positive 8	Grapes	7472	6.3 (1.8)	4.0 (2.3)		1.7%	1151.7 (878.7)
Negative 1	Snake	1050	3.5 (2.2)	6.9 (1.7)		3.1%	1060.0 (685.7)
Negative 2	Roaches	1271	3.2 (1.6)	5.4 (2.4)		6.1%	1314.2 (947.9)
Negative 3	Waste	7079	3.8 (1.4)	4.5 (1.9)		2.6%	1043.4 (782.1)
Negative 4	Cemetery	9001	3.1 (2.0)	3.7 (2.3)		6.1%	1262.9 (888.5)
Negative 5	Barbed wire	9010	3.9 (1.7)	4.1 (2.1)		3.0%	1120.8 (645.7)
Negative 6	Puddle	9110	3.8 (1.4)	4.0 (2.2)		0.0%	1199.2 (898.8)
Negative 7	Garbage	9291	2.9 (1.2)	4.4 (2.1)		1.7%	1026.7 (668.2)
Negative 8	Burning car	9909	2.8 (1.5)	6.0 (2.0)		3.0%	1096.0 (830.9)

Table A. Continued

						Ease of stimulus classification[a], N = 230	
Stimulus	**Description**	**IAPS no.**	**Valence (SD)**	**Arousal (SD)**	**CVI, n = 35**	**Error rate**	**Mean latency in ms (SD)**
Target stimuli							
Target 1					.91	13.0%	1253.0 (1145.5)
Target 2					.91	10.9%	1253.6 (1005.6)
Target 3					.97	12.6%	1304.2 (1097.5)
Target 4					.85	12.2%	1391.8 (1238.6)
Target 5					.91	13.5%	1162.0 (763.4)
Target 6					.94	10.9%	1365.8 (1235.6)
Target 7					.85	11.7%	1418.9 (1105.2)
Target 8					.88	14.3%	1248.2 (1014.0)
Mean							
Attributes positive			7.4 (1.5)	4.8 (2.4)		4.7%	1096.0 (706.3)
Attributes negative			3.4 (1.6)	4.9 (2.1)		3.2%	1140.4 (793.5)
Attributes total						4.0%	1118.2 (749.9)
Targets total						12.4%	1299.7 (1075.7)
Stimuli total						6.8%	1178.7 (858.5)

Table B. Percentages of participants agreeing that a given theme is represented within the respected target stimulus, n = 35.

	Target stimulus							
Theme	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Physical activity	**97%**	47%	18%	9%	77%	**97%**	50%	41%
2. Contact by touching	**100%**	29%	18%	15%	27%	**94%**	35%	29%
3. Taking care of the appearance	47%	41%	29%	24%	32%	38%	**97%**	21%
4. Relaxation	**97%**	47%	59%	59%	50%	**82%**	29%	**82%**
5. Healthy living	**91%**	**91%**	35%	24%	50%	**94%**	41%	41%
6. Household activities	3%	**88%**	9%	9%	9%	6%	12%	9%
7. Creating something	6%	**91%**	18%	12%	68%	18%	15%	**97%**
8. Brain stimulation	74%	**88%**	**94%**	74%	**94%**	79%	56%	**97%**
9. Music	9%	9%	6%	27%	**94%**	12%	6%	9%
10. Going out	**97%**	21%	27%	6%	21%	**88%**	27%	21%
11. Precious memories	59%	56%	53%	**82%**	59%	59%	47%	53%
12. Stimulating the senses	**91%**	**91%**	**82%**	79%	**91%**	**91%**	**82%**	**91%**
13. Contact with others	**88%**	**97%**	**91%**	**85%**	**97%**	**91%**	**82%**	74%
14. Nature	**100%**	9%	6%	9%	3%	**94%**	3%	21%
15. Faith and meaning	18%	21%	21%	29%	24%	24%	15%	32%
16. Doing something for someone else	35%	**88%**	41%	38%	56%	47%	47%	32%
17. Security and warmth	74%	77%	77%	79%	71%	**82%**	74%	62%
18. Positive attitude	**85%**	**100%**	**88%**	**88%**	**88%**	**91%**	**88%**	**85%**

Note. Bolded percentages indicate instances where at least 80% of participants agreed that a given theme is represented within the respected target stimulus (answering option "yes"). The answering option "don't know" was considered missing.
n = Subsample size.

PART 3

Effects of priming caregivers with information about resident depression on their implicit associations regarding mood-improving behaviors

Chapter 7

Priming nursing home caregivers with information about resident depression status: effects on implicit attitude and motivation regarding behaviors to improve resident mood

[submitted for publication]

Inge A.H. Knippenberg
Ruslan Leontjevas
Ine J.N. Declercq
Jacques J.D.M. van Lankveld
Debby L. Gerritsen

Abstract

Objective: This study examined whether priming nursing home caregivers with information about resident depression status affects their implicit attitude (positive versus negative valence) and implicit motivation (wanting versus not wanting) regarding caregiver behaviors to improve resident mood.

Method: A randomized within-subjects design with three time points at monthly intervals was used. Dutch nursing home caregivers completed two Implicit Association Tasks (IATs) at each time point (N = 119, 85, 81): the Valence towards Behaviors to improve resident Mood IAT and the Motivation for Behaviors to improve resident Mood IAT. Three textual vignettes were used as primes, each representing a resident at a different depression level: A) no depression, B) depressive symptoms without a depression diagnosis, and C) depressive symptoms with a depression diagnosis.

Results: Mixed model analyses indicated that, compared to the absence of depression, neither priming with depressive symptoms (estimated effect: -0.06 [95% CI: -0.29, 0.17]) nor with a depression diagnosis (-0.08 [-0.31, 0.15]) significantly predicted caregiver implicit attitude. However, priming with depressive symptoms, compared to no depression, significantly predicted caregiver implicit motivation (0.23 [0.01, 0.45]), while priming with a depression diagnosis did not (0.13 [-0.08, 0.34]).

Conclusions: Priming caregivers with information about resident depression status may not significantly influence their implicit attitude towards mood-improving behaviors for residents but may affect their implicit motivation for these behaviors. Caregivers might be more motivated to engage in mood-improving behaviors when aware of depressive symptoms, though knowing about the presence of a formal depression diagnosis may not impact this motivation.

Introduction

Depression is prevalent among nursing home residents and is associated with decreased quality of life and increased mortality (Gilman et al., 2017; Kane et al., 2010; Sivertsen et al., 2015; Van Asch et al., 2013). In addition to conventional treatments such as antidepressant medication and psychotherapy (Burley et al., 2022; Declercq et al., 2024; Gramaglia et al., 2021; Simning & Simons, 2017), professional caregivers may play a key role in improving resident mood through their daily interactions (Haugan et al., 2013; Lee et al., 2017). For instance, specific caregiver behaviors, such as providing personal attention, have been linked to better mood outcomes in residents (Haunch et al., 2023; Knippenberg et al., 2022; Meeks & Looney, 2011). Gaining insight into cognitive processes that influence such caregiver behavior may contribute to the understanding of caregiver roles in managing depression among nursing home residents.

Research indicates that both controlled (deliberate) and automatic (intuitive) cognitive processes influence behavior across various domains (e.g., physical activity, alcohol consumption, and sexual behaviors) (Cunningham & Zelazo, 2007; Elliot, 2013; Nosek et al., 2011). Controlled processes, which are accessible through introspection, can be assessed directly using instruments such as interviews and questionnaires. In contrast, automatic cognitive processes are generally considered effortless, unintentional, and occur without conscious awareness (Bargh et al., 2012; Fisher, 2012). To study these automatic processes, researchers use indirect measures such as the Implicit Association Task (IAT) (Bar-Anan & Nosek, 2014; Brownstein et al., 2019; De Houwer et al., 2009; Fazio & Olson, 2003; Greenwald et al., 2002). IATs are designed to capture automatic processes by evaluating the relative strength of implicit associations between concepts (e.g., the relation of ‘depressed’ with ‘negative’ versus ‘not depressed’ with ‘positive’) (Greenwald et al., 2022). By circumventing introspection and reducing socially desirable responses, indirect measures can offer distinct and complementary insights in addition to those obtained from direct measures (Cunningham & Zelazo, 2007; Gawronski & De Houwer, 2014; Nosek et al., 2011).

In behavioral studies, it is important to distinguish between implicit attitude (positive or negative valence) and implicit motivation (wanting or not wanting), as each may drive different outcomes (Berridge, 2009; Koranyi et al., 2017; Meissner et al., 2019). These two forms of implicit associations can function independently, as demonstrated in addiction research, where individuals may continue to long for (motivation) a substance even when they no longer enjoy it (attitude) (Robinson & Berridge, 1993). Similarly, heavy drinkers may experience increased desire for alcohol after a priming dose, without a corresponding rise in enjoyment (Hobbs et al., 2005). In the context of eating behavior, food deprivation can increase the desire for food without necessarily enhancing the pleasure of eating (Epstein et al., 2003). These findings highlight the relevance of differentiating between implicit attitude and motivation, as they can influence behaviors in distinct ways.

In the context of nursing home residents with depression, caregivers' deliberate preferences and attitudes toward depression can influence their caregiving approaches (Areán et al., 2003; Monteith & Pettit, 2011; Sereno et al., 2022). Automatic cognitive processes are also likely to play a significant role. For instance, caregivers might demonstrate a positive attitude and engage in mood-improving behaviors for residents with depressive symptoms, yet their intuitive willingness to do so may change when faced with a formal depression diagnosis. However, research in this area is still limited. Investigating the automatic cognitive processes of caregivers in response to emotional states of residents could provide valuable insight into how to better support and improve the moods of nursing home residents.

This study therefore aimed to contribute to the understanding of automatic cognitive processes that guide caregiver behaviors for improving resident mood. Specifically, this study explored whether priming caregivers with information about depressive symptoms or formal depression diagnosis in residents influences their implicit attitude (positive versus negative valence) and motivation (wanting versus not wanting) regarding mood-improving behaviors of caregivers for residents.

Method

Transparency and openness

Statistical analyses were conducted using IBM SPSS version 29 (IBM Corporation., 2022). We report how we determined our sample size and describe all data exclusions, manipulations, and measures used in the study. The study design, hypotheses, and analytic plan were not pre-registered. The baseline data presented in this manuscript were also used in another manuscript (Knippenberg et al., 2025); however, each study conducted distinct analyses and reports unique findings. De-identified data, analytic code, and materials for this study are available at https://osf.io/ywdjq/ (Knippenberg et al., 2024).

Study design

This study employed an experimental longitudinal within-subjects design with measurements taken at three time points, each separated by a 1-month interval. At each time point, participants completed three computer-based reaction time tasks consisting of two IATs (Greenwald et al., 1998) – namely, the Valence towards Behaviors to improve resident Mood IAT (VBM-IAT) and the Motivation for Behaviors to improve resident Mood IAT (MBM-IAT) (Knippenberg et al., 2025) – and a Simon task (Simon, 1990). The Simon task was completed between the two IATs to reduce potential task interference (Kiesel et al., 2010). Additionally, participants provided demographic information through an online questionnaire at baseline.

To account for potential order effects, participants were randomly allocated to start with either the VBM-IAT or the MBM-IAT. Additionally, the sequence of blocks within each IAT was balanced, with participants randomly starting with either the hypothesis-consistent block (with a shared response key for the target stimuli and the "positive" and "I want" stimuli) or hypothesis-inconsistent block (where target stimuli shared the response key with "negative" and "I do not want" stimuli, see **Table 1**). These allocations remained consistent for each participant across all assessments.

To explore whether priming caregivers with information about resident depression affects their implicit attitude and motivation regarding mood-improving behaviors for residents, textual vignettes were used as primes (see **Table 2**). At baseline, participants were randomly assigned to one of three vignettes. Each vignette described a resident at a different level of depression: A) no depression, B) depressive symptoms without a formal depression diagnosis, or C) depressive symptoms with a formal depression diagnosis. The vignettes were presented before both "attribute/target practice blocks" (Blocks 2 and 4; see **Table 1** and the 'Materials' section for details). Following each vignette, participants were presented with a multiple-choice question, which served two purposes: first, to encourage participants to thoroughly read the vignette, and second, to assess whether participant interpretations of the vignette corresponded with the researchers' intended manipulation (i.e., a manipulation check). For the second and third measurements, participants were presented the remaining two vignettes in random order.

Participants, setting, and procedure

Professional caregivers employed at Dutch nursing homes and actively involved in resident care were eligible for participation in this study. Recruitment involved contacting a 2.5% random sample of nursing homes listed on "ZorgkaartNederland" (2023), a public healthcare directory. These nursing homes were asked to distribute research invitations via email with eligible staff.

Study participants could use either a laptop or computer equipped with a keyboard, and they could choose a preferred location for participation, provided that the chosen setting caused minimal distractions. One month after the completing the baseline and second measurements, participants were automatically invited to the subsequent measurement. Data were collected between March and November 2023.

Table 1. Sequence of trial blocks in the IATs.

Block	Function	N trials	Stimuli assigned to left-key response (N trials)	Stimuli assigned to right-key response (N trials)
1	Attribute practice	16	Positive images[a] (8)	Negative images[b] (8)
-	Vignette presentation[c]	-	-	-
2	Attribute/target practice	32	Positive images (8) & Images representing mood-improving behaviors of caregivers for nursing home residents (8)	Negative images (16)
3	Attribute/target test	64	Positive images (16) & Images representing mood-improving behaviors of caregivers for nursing home residents (16)	Negative images (32)
-	Vignette presentation	-	-	-
4	Attribute/target practice	32	Positive images (16)	Negative images (8) & Images representing mood-improving behaviors of caregivers for nursing home residents (8)
5	Attribute/target test	64	Positive images (32)	Negative images (16) & Images representing mood-improving behaviors of caregivers for nursing home residents (16)

Note. For half the subjects, the positions of Blocks 2 and 3 are switched with those of Blocks 4 and 5, respectively.
[a]Positive images represented positive valence and wanting.
[b]Negative images reflected negative valence and not wanting.
[c]During the IAT task, participants were primed with one of three vignettes, randomly assigned to each participant. Each vignette was presented twice during the task.

Materials

Measurement equipment and software

Data collection was facilitated using the secured O4U research platform (Slot, 2023), which enabled the collection of responses to online questionnaires and computer-based tasks. A demographic questionnaire was created in LimeSurvey (LimeSurvey Project Team and Schmitz, 2015). Lab.js facilitated the construction of the reaction time tasks (i.e., the IATs and the Simon task) (Henninger et al., 2022).

Table 2. Vignettes.

General information	
Gender:	Female
Age:	83 years
Marital status:	Widow
Duration of stay at the nursing home:	1 year
Observation	

Vignette A) Ms. appears well groomed and actively participates in activities. She seeks contact with fellow residents and is frequently found in communal areas. She maintains a healthy appetite and reports sufficient energy.

Vignette B) Ms. appears gloomy. She spends most of her time alone in a room, seldom seeks interaction with fellow residents and shows reluctance to engage in activities. She exhibits a decreased appetite and consumes little. Additionally, she frequently expresses feelings of tiredness and lack of energy.

Diagnostic research was conducted to gain further insight into depressive symptoms. There is NO indication of a depression diagnosis.

Vignette C) Ms. appears gloomy. She spends most of her time alone in a room, seldom seeks interaction with fellow residents and shows reluctance to engage in activities. She exhibits a decreased appetite and consumes little. Additionally, she frequently expresses feelings of tiredness and lack of energy.

Diagnostic research was conducted to gain more insight into depressive symptoms. The diagnosis of depression was confirmed.

Demographic characteristics

Participants provided the following demographic characteristics: sex, age, professional function (i.e., registered nurse, certified nurse assistant, nurse assistant / nurse aide, other), years of working experience, type of ward (i.e., medical-somatic care, dementia special care, mental-physical multimorbidity care, other). Additionally, participants indicated the regularity of their involvement in the care of residents with depression on a 5-point scale ranging from “never” to “very often.”

IAT tasks

This study utilized two single-category IATs (Karpinski & Steinman, 2006): the Valence towards Behaviors to improve resident Moods IAT (VBM-IAT) and the Motivation for Behaviors to improve resident Moods IAT (MBM-IAT). These tasks assessed participants’ implicit attitude and implicit motivation towards mood-improving behaviors, respectively (Knippenberg et al., 2025). Each IAT used images as stimuli, with eight images representing caregiver behaviors aimed at improving resident mood (i.e., target stimuli) and 16 images reflecting either positive (N = 8) or negative (N = 8)

valence content (i.e., attribute stimuli for attitude and motivation) (see (Knippenberg et al., 2025) for details).

For both IATs, the target category was labeled "do something" (in Dutch: "*iets doen*"). In the VBM-IAT, the attribute categories were labeled "positive" ("*positief*") and "negative" ("*negatief*"), while the MBM-IAT used "I want" ("*wil ik graag*") and "I do not want" ("*wil ik niet graag*") for its attribute categories. The target and attribute labels were displayed in the upper-left and upper-right corners of the screen, with their positions and combinations varying depending on the block.

Each IAT consisted of five blocks (see **Table 1**). Block 1 used only attribute stimuli and categories (i.e., "positive" and "negative" for the VBM-IAT, "I want" and "I do not want" for the MBM-IAT). In the subsequent blocks, target and attribute stimuli were combined. In Blocks 2 and 3, target stimuli were paired with one set of attribute stimuli, with the response key for "do something" corresponding to one attribute label. For blocks 4 and 5, the pairing was switched to the other attribute label.

Stimuli were presented in the center of the screen, with a 150-millisecond interval following each correct response. Participants were instructed to categorize stimuli into the appropriate category, as indicated by the displayed labels, using the left ('E') or right ('I') computer keys. Errors triggered a red X at the center of the screen until the correct key was pressed. To prevent response bias, the task required an equal number of left and right keyboard responses. This was achieved by presenting stimuli from the attribute category that did not match the target category twice as often as those that matched (see **Table 1**).

D-values representing the VBM-IAT and MBM-IAT scores were calculated using the scoring algorithm with an integrated error penalty procedure (Greenwald et al., 2022), including data from Blocks 2 to 5. Trials with response times longer than 10,000 milliseconds were excluded, affecting 111 out of 108,288 trials (0.1%). No data were removed for response times under 300 milliseconds, as none of the participants exceeded the 10% threshold for such cases. Higher D-values indicate stronger implicit associations between positive valence or wanting with mood-improving behaviors for residents, suggesting more favorable attitudes or heightened motivation regarding mood-improving behaviors of caregivers for residents.

Vignettes

The researchers created three textual vignettes, each presenting a distinct scenario reflecting the mood of a nursing home resident. Vignette A described a resident without depressive symptoms; vignette B represented a resident displaying signs of depression but stated that the resident had not been formally diagnosed with depression; and vignette C portrayed a resident described as having been formally diagnosed with

depression. All vignettes contained the same characteristics for the described resident (i.e., gender, age, marital status, and duration of stay at the nursing home). The descriptions in vignettes B and C were identical, except that in vignette C, the resident was described as having been formally diagnosed with depression.

After the initial vignettes were drafted, 41 caregivers (five nurse assistants, 20 certified nurse assistants, and 16 registered nurses; mean age: 45.0 years [SD = 13.2]; female: N = 37, 90.2%) were invited to evaluate the vignettes' clarity, credibility, and relevance to caregiving contexts through an online survey. Based on their feedback, the research team refined the vignettes. The final versions of the vignettes are presented in **Table 2**.

Manipulation check

A manipulation check was conducted to verify whether participant understanding of the vignette aligned with the intentions of the researchers. After reading the vignette, participants answered a multiple-choice question regarding the scenario (i.e., "What is your perception of the mental status of the resident?"). Answer options aligned with the content of the three vignettes: "No depression," "Depressive symptoms without a formal depression diagnosis," or "Depressive symptoms with a formal depression diagnosis." It was emphasized to the participants that they were merely being asked for their perception and that there were no right or wrong answers. Since one of the purposes of this question was to ensure that participants read the vignette and not to assess their recall, the vignette remained visible until participants responded to the question.

Simon task

A Simon task (Simon, 1990) was incorporated as a wash-out measure between IAT administrations to minimize potential task interference (Kiesel et al., 2010). The Simon task investigates spatial location interferences resulting from conflicting stimulus-response location combinations (i.e., compatible versus incompatible conditions). In this study, the task involved participants viewing random sequences of blue and green circles appearing on either the left or right side of the screen. Participants were instructed to respond to the color of the stimulus (i.e., 'E' key for blue and 'I' for green) while disregarding its position. The purpose of the Simon task in this study was only to minimize potential carry-over effects from the IATs. Therefore, the data collected for this task were not subjected to further analysis.

Ethics statement

This study adhered to the research framework approved by the Radboudumc Ethics Committee (reference 2021-11047), which confirmed that this study did not fall under the purview of the Medical Research Involving Human Subjects Act; accordingly, no further ethical approval was required. The study was executed in compliance with Dutch legislation and the Declaration of Helsinki (World Medical Association, 2013).

Participants received information about the study and provided their informed consent. Participants who completed the study received a 20-euro gift card.

Analysis

A factorial ANOVA was conducted to assess the potential influence of IAT order on implicit attitude and motivation regarding behaviors to improve resident mood. Several types of order effects were investigated: within-IAT order (hypothesis-consistent or -inconsistent blocks first), the sequence between IATs (whether the VBM-IAT or MBM-IAT was presented first), the sequence of vignettes across the time points, and the interactions of these potential order effects (e.g., Within-IAT order x Between-IAT sequence).

For each vignette, two dummy variables were derived: one for the absence or presence of depressive symptoms and another for the absence or presence of a formal diagnosis of depression. This coding was also applied to participant responses to the manipulation check question. Cross-tabulation analyses were then performed to check whether participant responses to the manipulation check matched the corresponding vignette, by calculating the percentages of correct responses.

Subsequently, using linear mixed model analyses the research team examined whether priming caregivers with information about resident depression status influences their implicit associations with mood-improving behaviors. Depressive symptoms (yes/no) and depression diagnosis (yes/no) were used as predictors, with “no” as the reference category. Caregiver implicit attitude and motivation, as measured with the VBM-IAT and the MBM-IAT, served as the outcomes. For each outcome, three models were constructed: one for each predictor independently and a combined model with both predictors adjusting for each other. The VBM-IAT and MBM-IAT scores were standardized for analysis.

To address potential order effects (as assessed by the previously described factorial ANOVA), subsequent sensitivity analyses were conducted by adding a significant order effect as a fixed factor to the linear mixed model analyses. Furthermore, additional sensitivity analyses were performed to compare the outcomes of the initial analyses, which included all responses regardless of alignment with the intended vignette, with the results of alternative analyses, which excluded participants with an incorrect response to the manipulation check.

The required sample size was estimated using G*Power 3 (Faul et al., 2007), employing the repeated measures ANOVA (within-between factors) test for three measurements with two groups (presence or absence of depression). The analysis suggested a sample size of 82 participants for a power level of .80, a significance level of .05, and a partial eta squared of .02.

Results

Participants

Table 3 presents the demographic characteristics of the participants across the three assessment points. At baseline, 119 caregivers were included in the study, with follow-up rates of 71.4% (N = 85) and 68.1% (N = 81) at subsequent time points. Most of the participants were female and employed as registered nurses or certified nurse assistants in medical-somatic or dementia special care units. The mean age of participants at baseline was 41.5 years (SD = 13.0), with an average working experience of 12.0 years (SD = 11.6). All participants reported at least some level of involvement in caring for residents with depression.

The allocation of participants to vignettes at baseline was as follows: N = 36 (30.3%) for vignette A, N = 35 (29.4%) for vignette B, and N = 48 (40.3%) for vignette C. Concerning the sequence of IAT administration, 61 participants (51.3%) commenced with the VBM-IAT, while the remaining participants initiated with the MBM-IAT. Regarding the order within each IAT, 62 participants (52.1%) started with the hypothesis-consistent blocks.

Order effects

With implicit attitude as outcome variable, a significant order effect was identified for the interaction between IAT sequence and Block order ($F(1, 95) = 7.80$, $p = .006$, $\eta^2 = .08$). In the ‘VBM-IAT first’ condition, participants had higher D-values for implicit attitude when they encountered hypothesis-inconsistent blocks first ($M = 0.34$, $SD = 0.25$) than when they encountered hypothesis-consistent blocks first ($M = 0.16$, $SD = 0.25$). The opposite pattern was found in the ‘MBM-IAT first’ condition, where D-values for implicit attitude were higher for hypothesis-consistent blocks first ($M = 0.23$, $SD = 0.19$) than for hypothesis-inconsistent blocks first ($M = 0.16$, $SD = 0.25$). Regarding implicit motivation, a significant main-order effect between IAT administrations was found ($F(1, 93) = 6.58$, $p = .012$, $\eta^2 = .07$). Participants displayed higher D-values for implicit motivation when the MBM-IAT was presented first ($M = 0.31$, $SD = 0.28$) compared to when the VMB-IAT was presented first ($M = 0.17$, $SD = 0.20$). No other significant order effects were detected for either implicit attitude or motivation ($p > .05$).

Manipulation check

Throughout all administrations of the IAT, 92.5% of participants accurately responded to the question aimed at assessing their perception of the vignette scenario, aligning with the researchers’ intended meaning (i.e., the presence or absence of depressive symptoms and diagnosis). Participant evaluation of the presence of depressive

symptoms achieved the highest accuracy (94.1%), while the estimation of a depression diagnosis attained a slightly lower accuracy (90.8%).

Table 3. Demographic characteristics of participants.

	T0	T1	T2
N	119	85	81
Sex, female, N (%) / male, N	106 (90.6) / 11	77 (92.8) / 6	74 (93.7) / 5
Age, mean, (SD) [range]	41.5 (13.0) [18-66]	41.8 (12.5) [18-66]	41.7 (12.6) [18-66]
Type of professional caregiver, N (%)			
Registered nurse	52 (44.1)	42 (50.0)	42 (52.5)
Certified nurse assistant	57 (48.3)	36 (42.9)	32 (40.0)
Nurse assistant / nurse aide	7 (5.9)	4 (4.8)	4 (5.0)
Other	2 (1.7)	2 (2.4)	2 (2.5)
Years of working experience, mean (SD) [range]	12.0 (11.6) [1-43]	11.5 (11.2) [1-42]	11.3 (11.3) [1-42]
Type of ward employment[a], yes N (%) / no, N			
Medical-somatic care	57 (48.3) / 61	39 (46.4) / 45	38 (47.5) / 42
Dementia special care	75 (63.6) / 43	52 (61.9) / 32	49 (61.3) / 31
Mental-physical multimorbidity care	10 (8.5) / 108	7 (8.3) / 77	6 (7.5) / 74
Other	9 (7.6) / 109	6 (7.1) / 78	6 (7.5) / 74
Regularity of involvement in the care of residents with depression, N (%)			
Never	0 (0.0)	0 (0.0)	0 (0.0)
Occasionally	36 (30.5)	24 (28.6)	24 (30.0)
Regularly	62 (52.5)	47 (56.0)	44 (55.0)
Often	16 (13.6)	11 (13.1)	10 (12.5)
Very often	4 (3.4)	2 (2.4)	2 (2.5)

Note. Valid percentages are shown.
[a]The sum of type of ward employment percentages does not equal 100% because individuals may work in multiple wards.

Influence of priming

The results of the linear mixed model analyses are shown in **Table 4**. Initial analyses indicated that, compared to the absence of depression, priming caregivers with information about the presence of depressive symptoms (Model 1) or a formal depression diagnosis (Model 2) did not significantly predict caregiver implicit attitude towards mood-improving behaviors. However, priming with information about depressive symptoms significantly predicted implicit motivation, though with

a small effect size, while priming with a formal depression diagnosis had no significant effect on implicit motivation. In the combined model (Model 3), where both depressive symptoms and diagnosis were included as predictors, neither significantly influenced implicit attitude or motivation, but the effect sizes remained largely similar to those in Models 1 and 2. Sensitivity analyses, which accounted for significant order effects and excluded participants who provided an incorrect response to the manipulation check, yielded similar effect sizes but did not result in any significant outcomes.

Discussion

This study aimed to enhance the understanding of the role caregivers play in managing depression among nursing home residents. For this, this study examined whether priming caregivers with information about depressive states in residents affects their implicit attitude (positive or negative valence) and motivation (wanting or not wanting) regarding mood-improving behaviors for residents. The findings indicate that while caregiver attitude towards mood-improving behaviors may not be significantly impacted by knowledge about resident mood status (i.e., the presence of depression), their motivation to engage in such behaviors might be slightly influenced. Caregivers may be more implicitly motivated to engage in mood-improving behaviors when they know a resident has depressive symptoms, compared to when such symptoms are absent. However, the findings did not support the idea that awareness of a formal depression diagnosis in residents influences caregiver motivation.

Notably, the results indicated a potential distinction between caregiver attitudes and caregiver motivations regarding mood-improving behaviors in response to residents with depression. Specifically, while caregivers may consistently value ('like') mood-improving behaviors regardless of resident mood status (reflecting a stable implicit preference for these behaviors), their motivation to act could be responsive to observable emotional needs of the resident. This distinction between stable attitudes and context-dependent motivations mirrors findings from other psychological research, where dissociations between liking and wanting are commonly reported (Epstein et al., 2003; Hobbs et al., 2005; Koranyi et al., 2017; Robinson & Berridge, 1993). One possible explanation for this dissociation is the concept of 'required effort,' as suggested by Waugh and Gotlib (2008). In their study, they found that while the liking of reward stimuli tends to remain stable, the wanting of those stimuli can vary depending on the amount of effort required to obtain the reward. In the context of caregiving, this may imply that caregivers might consistently value mood-improving behaviors but may feel more motivated to engage in such behaviors when the emotional needs of residents are more explicitly apparent.

Table 4. Fixed effect estimates of priming caregivers with information about resident depression status on implicit attitude and implicit motivation regarding mood-improving behaviors.

		Model 1				Model 2				Model 3			
		N	Estimate (SE)	95% CI	p-value	N	Estimate (SE)	95% CI	p-value	N	Estimate (SE)	95% CI	p-value
Initial analyses[a]													
Implicit attitude	Depressive symptoms	117	-.06 (.12)	[-.29; .17]	.613					117	-.02 (.14)	[-.29; .25]	.868
	Depression diagnosis					117	-.08 (.12)	[-.31; .15]	.486	117	-.07 (.14)	[-.34; .20]	.604
Implicit motivation	Depressive symptoms	**115**	**.23 (.11)**	**[.01; .45]**	**.045**					115	.22 (.13)	[-.04; .47]	.102
	Depression diagnosis					115	.13 (.11)	[-.08; .34]	.232	115	.02 (.13)	[-.23; .27]	.884
Corrected for order effects[b]													
Implicit attitude	Depressive symptoms	117	-.07 (.12)	[-.30; .16]	.561					117	-.03 (.14)	[-.30; .24]	.820
	Depression diagnosis					117	-.09 (.12)	[-.32; .14]	.458	117	-.07 (.14)	[-.34; .20]	.599
Implicit motivation	Depressive symptoms	**115**	**.22 (.11)**	**[.00; .44]**	**.047**					115	.20 (.13)	[-.06; .46]	.126
	Depression diagnosis					115	.14 (.11)	[-.07; .36]	.185	115	.04 (.13)	[-.21; .29]	.749
Only data from participants with correct responses to the manipulation check[c]													
Implicit attitude	Depressive symptoms	114	-.07 (.12)	[-.30; .17]	.579					112	-.07 (.14)	[-.34; .21]	.635
	Depression diagnosis					114	-.00 (.12)	[-.25; .24]	.978	112	.01 (.14)	[-.27; .29]	.933
Implicit motivation	Depressive symptoms	112	.21 (.12)	[-.03; .44]	.081					108	.23 (.14)	[-.05; .50]	.104
	Depression diagnosis					111	.11 (.12)	[-.13; .34]	.360	108	-.01 (.14)	[-.29; .27]	.922

Note. Three models were constructed for each outcome: two individual models (one for each predictor without adjustments for the other predictor) and one combined model (Model 3) with both predictors included and corrected for each other. In all models, implicit attitude and implicit motivation are standardized, and depressive symptoms and depression diagnosis are coded as dummy variables with 'no' as the reference category. Standard errors are presented in parenthesis, 95% confidence intervals are provided in brackets, and *p*-values less than .05 are highlighted in bold.

[a]Initial analysis including all responses without correcting for any potential order effects

[b]Sensitivity analysis adjusting for significant order effects

[c]Sensitivity analysis including only data from participants who provided a correct answer to the manipulation check question

Additionally, the frequency of behaviors has been mentioned as another possible factor influencing this dissociation. File et al. (2022) suggest that the frequency of engaging in a behavior can impact the relationship between liking and wanting. Frequent engagement in a behavior may lead to habituation, where the initial liking remains, but the motivation to continue the behavior may diminish unless reinforced by new or stronger stimuli. In the caregiving context, this could mean that caregivers who frequently engage in mood-improving behaviors may experience a decrease in their motivation to continue to do so unless they perceive a significant emotional need from the resident.

The findings of this study also suggest that while the presence of depressive symptoms may increase caregiver implicit motivation to engage in behaviors to improve resident mood, a formal depression diagnosis does not seem to elicit the same response. Previous research indicates that observable symptoms tend to provoke a more immediate and tangible reaction, potentially enhancing the motivation to act, while a formal diagnosis might be perceived as more abstract and daunting, potentially leading caregivers to view their efforts as less effective or the condition as more permanent and resistant to change (Corrigan & Watson, 2002; Jorm & Griffiths, 2008; Lubkin & Larsen, 2013). This perception could reduce caregiver motivation to intervene. These findings highlight the need for further research into how caregiver perceptions of symptoms versus diagnosis may influence their actions.

When both depressive symptoms and a formal diagnosis were controlled for, the effect size of depressive symptoms on implicit motivation remained similar but became statistically non-significant. This could be explained by the study's limited sample size, affecting the power to detect small effects (Maxwell, 2004).

Strengths and limitations

A primary strength of this study was its focus on caregiver reactions to mood-improving behaviors for nursing home residents with depression, rather than on caregiver evaluation of depression itself in residents. Research supports that evaluating specific behaviors is a more accurate predictor of the actual occurrence of those behaviors, rather than merely examining the subject or condition the behavior addresses (Ajzen et al., 2018). By emphasizing caregiver responses to behaviors across different contexts (i.e., residents with varying mood statuses), this study enhances understanding of the behavioral dynamics in caregiving for residents and contributes to understanding the role of caregivers in managing depression in nursing home residents.

Another strength of this study is its use of vignette-based manipulations to prime automatic responses to visual stimuli, allowing for a controlled experimental setup. These vignettes are adaptable for future research on other caregiving situations.

Additionally, the inclusion of both attitude and motivation IATs facilitated a nuanced interpretation of the study's results, providing a better understanding of the automatic cognitive processes that may influence caregiver behavior in nursing home settings.

Finally, the randomized within-subjects design provided control over experimental conditions (i.e., by examining potential order effects and manipulation checks), which strengthens the causal interpretation of the findings. This study offers a first indication of a potential influence of automatic information processing on depression-reducing behavior in caregivers.

However, this study also has several limitations. Although attitudes, whether deliberate or automatic, have been shown to be one of the best predictors of actual behavior available (Sheeran et al., 2016), measuring implicit associations with behavior rather than actual caregiving behavior limits the direct applicability of the findings to real-world settings (Kurdi et al., 2019; Meissner et al., 2019). Moreover, the use of vignettes may also compromise the ecological validity of the results. While vignettes ensure consistency, they might not fully capture the complexity and realism of actual caregiver-resident interactions (Aguinis & Bradley, 2014; Evans et al., 2015). The limitations to the validity and reliability of the IATs used (Knippenberg et al., 2025) indicate further caution in drawing strong conclusions from the findings. Finally, the observed modest effect sizes suggest a need for cautious interpretation regarding the clinical significance of these results. While the study provides valuable insights into the implicit attitudes and motivations of caregivers concerning mood-improving behaviors for residents, ongoing research is needed to replicate and expand on these findings.

Future directions

Future research could explore additional factors related to mood-improving behaviors, such as caregivers' personal experience with depression or their beliefs regarding the treatability of depression. Incorporating implicit behavioral tasks (e.g., approach-avoidance tasks) or direct observations could offer a more comprehensive understanding of the cognitive, emotional, and behavioral processes involved in addressing resident depression. Furthermore, studies could investigate how implicit attitudes and motivations regarding mood-improving behaviors predict actual caregiving actions and whether they affect resident well-being. Such research could inform the development of targeted training programs aimed at enhancing implicit attitudes, motivations, and behaviors. Expanding the research scope – by using different vignettes or conducting studies in other settings – and using various measurement instruments could provide deeper insights into caregiver-resident interactions, informing improved training and support strategies in caregiving contexts.

Conclusions

This study provides initial support for a potential influence of automatic information processing on depression-reducing behaviors of caregivers for nursing home residents. While providing information about resident mood status may not significantly impact implicit attitudes of caregivers toward mood-improving behaviors, it could influence their implicit motivation to engage in such behaviors. This study suggests that caregivers may be more likely to feel motivated to act when they know a resident has depressive symptoms, compared to when such symptoms are absent. Knowledge about the presence of a formal depression diagnosis does not seem to affect this motivation. Given the modest effect sizes and the study limitations, new research is needed to confirm and expand upon these findings. Future research could replicate this study in different settings and populations, as well as explore other factors that might influence caregiving behavior.

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Discussion

Chapter 8

General discussion

This thesis advances the understanding and measurement of mood-improving behaviors in nursing homes. The studies presented in this thesis focused on identifying, measuring, and exploring behaviors exhibited by residents, relatives, and professional caregivers that may contribute to improving resident mood. In addition to individual mood-improving behaviors, one study also explored the potential influence of environmental stimuli on residents' mood. Although environmental stimuli were not an original focus of this thesis, the COVID-19 pandemic offered a unique opportunity to explore their potential impact.

This general discussion provides an overview of the studies' main findings and subsequently integrates and reflects upon them within the context of recent literature. It then addresses conceptual and methodological considerations before concluding with implications and recommendations for caregiving practices, education, and future research.

Overview of the main findings

Part 1. Mood-improving behaviors and environmental stimuli in nursing homes

The first part of this thesis describes studies that identified and explored behaviors of nursing home residents, relatives, and professional caregivers that may contribute to improving resident mood. Additionally, it explored the influence of environmental stimuli on challenging behaviors in residents, including depressive behaviors. In this context, depressive behaviors are understood—following Zuidema et al. (2018)—as the presence of depressive symptoms, regardless of whether these symptoms meet the diagnostic criteria for, or have been formally diagnosed as, a mood disorder such as major depressive disorder.

The longitudinal observational study reported in ***Chapter 2*** demonstrated that residents who participated in activities with higher levels of social or cognitive engagement experienced fewer depressive symptoms than those who participated in activities with lower levels of these components. Notably, the positive effect of the social component was evident regardless of the level of other activity components (i.e., physical, creative, cognitive, and musical). These findings suggest the value of behaviors related to social engagement—and, to some extent, cognitive engagement—in supporting resident mood.

The Group Concept Mapping Studies described in ***Chapter 3*** further identified a range of behavioral strategies that residents, relatives, and professional caregivers can use to (potentially) improve resident mood. According to participants, building social connections and participating in meaningful activities were the most effective strategies residents themselves could employ. Providing personal attention to

residents was perceived as the most impactful approach employed by relatives and professional caregivers. Other strategies that stood out for their expected effectiveness or feasibility included creating a pleasant, homey environment and, for relatives and caregivers, adopting a positive, activating approach during interactions with residents, and encouraging resident participation.

In the cross-sectional study of ***Chapter 4,*** nursing home professionals suggested that reductions in non-intentional (untargeted) stimuli resulting from COVID-19 pandemic measures may be linked to an increase in depressive and apathic behaviors among residents, alongside a decrease in psychotic and agitated behaviors. Reductions in non-intentional stimuli may also be associated with an increase in challenging behavior for residents without dementia and a decrease in such behaviors for those with advanced dementia. These findings suggest that environmental stimuli may affect specific resident groups and types of challenging behaviors differently.

Building on these insights, the remainder of this thesis focuses specifically on mood-improving behaviors exhibited by residents and professional caregivers. These behaviors were considered from two complementary perspectives: 1) residents actively engaging in mood-improving behaviors (e.g., initiating social connection or participating in activities) and 2) caregiver behaviors that support or enable these resident efforts (e.g., fostering connections among co-residents or motivating residents to participate in activities).

Part 2. Measuring mood-improving behaviors and caregivers' implicit associations with these behaviors

To facilitate future investigations on both reflective (deliberate) and intuitive (automatic) processes related to mood-improving behaviors, this second part of the thesis focuses on developing and evaluating measurement instruments. Direct instruments (designed to assess reflective, deliberate processes) were developed for measuring mood-improving behaviors in residents and caregivers (***Chapter 5***), while indirect instruments (intended to capture more intuitive, automatic cognitive processes) were developed for measuring caregivers' implicit associations with these behaviors (***Chapter 6***).

Chapter 5 described the development and evaluation of two inventories for mapping mood-improving behaviors in nursing homes: the Actions to Improve Mood by Residents (AIM-R) and the Actions to Improve Mood by Caregivers (AIM-C). These inventories were designed to measure which mood-improving behaviors are performed by residents and caregivers, their frequency, and their expected effect on resident mood. While the AIM-R and AIM-C had limitations in their psychometric properties, they showed promise as practical instruments for identifying and integrating mood-

improving practices into daily life and nursing home care. Importantly, according to participants, their application may help raise awareness of the value of mood-improving practices that can be adopted by both residents and caregivers, either in the absence of or in addition to formal treatments for depression. Future research is needed to refine the inventories and further validate their psychometric properties to enhance both their research utility and practical application. In the meantime, these inventories could potentially serve as a starting point for raising awareness of mood-improving practices and contributing to a more supportive and engaging caregiving environment in nursing homes.

Chapter 6 reported on the development and evaluation of two Implicit Association Tasks (IATs) designed to measure caregiver implicit associations with their mood-improving behaviors: the Valence towards Behaviors to improve resident Mood IAT (VBM-IAT) which aims to measure implicit attitude (positive versus negative valence) towards these behaviors, and the Motivation for Behaviors to improve resident Mood IAT (MBM-IAT), which intends to assess implicit motivation (wanting versus not wanting) for these behaviors. These tasks may offer promising avenues for evaluating caregivers' automatic preferences and motivations regarding mood-improving behaviors. However, challenges with validity and consistency were observed, consistent with limitations commonly reported in similar IAT instruments. Despite these challenges, the VBM-IAT and MBM-IAT may still provide potential for exploring how caregivers' automatic cognitive processes could relate to their engagement in mood-improving behaviors, although findings should be interpreted with caution given the methodological limitations.

Part 3. Effects of priming caregivers with information about resident depression on their implicit associations regarding mood-improving behaviors

The third part of this thesis presents an experimental study that examined the impact of priming caregivers with text vignettes that included descriptions of residents with or without depressive symptoms and with or without a formal depression diagnosis on caregivers' implicit attitude and motivation regarding mood-improving behaviors (***Chapter 7***).

The findings revealed that caregivers' implicit motivation regarding mood-improving behaviors was higher after reading vignettes that described depressive symptoms, compared to the vignette describing no such symptoms. However, mentioning a formal diagnosis of depression in the vignette did not appear to impact this motivation. Additionally, the descriptions in the vignettes – whether they included depressive symptoms or a diagnosis – did not significantly influence caregivers' implicit attitude toward mood-improving behaviors. These results could suggest that caregivers may

be more likely to act when they notice signs of depressive symptoms in residents, indicating that fostering such attentiveness can serve as an entry point for improving caregiving practices.

Integration and reflections on the findings

This thesis contributes to the understanding of mood-improving behaviors in nursing homes by outlining *key behavioral strategies* and the *role of residents, relatives, and caregivers*. In addition, it sheds light on the potential influence of *caregivers noticing signs of depression in residents on their own mood-improving behaviors* and the potential *role of environmental factors on resident mood*. Complementing these insights, this thesis introduces innovative measurement instruments—self-report instruments designed to *measure mood-improving behaviors* in both residents and caregivers, alongside indirect, computer-based instruments to assess caregivers' *implicit associations* with these behaviors.

Mood-improving behaviors in nursing homes

Key behavioral strategies

The studies described in ***Chapters 2 and 3*** identified, clustered, and prioritized behavioral strategies that may contribute to improved resident mood in nursing homes. Based on these findings, we propose a conceptual categorization of the strategies into three overarching domains: *connection*, *mind*, and *body*. This categorization is not drawn from existing literature nor empirically evaluated within this thesis, but rather serves as a framework to organize and interpret the identified strategies.

The *connection* domain involves social interactions and meaningful activities that may support a sense of belonging, whether through relationships with others, participation in the community, engagement with the environment, or a deeper connection with oneself. *Mind* refers to cognitive and mental engagement, encompassing processes such as perceiving, remembering, and thinking about the world. Activities that may stimulate the mind include reading, reminiscing about meaningful experiences, and engaging with music, art, or nature, each of which may enhance cognitive engagement and evoke sensory and emotional responses that can contribute to resident well-being. The *body* domain includes physical stimulation such as physical activity, sensory experiences, relaxation, and self-care practices.

Connection. One of the most prominent findings across the studies in this thesis is the apparent significance of social and meaningful engagement in improving resident mood. The study in ***Chapter 2*** demonstrated that residents who participated in socially interactive activities reported fewer depressive symptoms than those who were less socially engaged. The findings in ***Chapter 3*** further highlighted the roles of

residents, relatives, and caregivers in facilitating social connections and meaningful engagement. For example, relatives and caregivers can support social connections by encouraging residents to participate in group activities, initiating conversations, and facilitating emotional support among residents. From a practical perspective, residents, relatives, and caregivers all considered social interaction and meaningful engagement as potentially effective and feasible strategies for improving mood (***Chapter 3***).

These findings align with established psychological theories and approaches that address the significance of social connection and engagement. Social Production Functions (SPF) Theory (Lindenberg, 1996) suggests that *behavioral confirmation* (by, for example, belonging to social groups) and *affection* contribute to social well-being. Similarly, Kitwood's person-centered care approach (Kitwood, 1997) highlights the importance of *inclusion* and *attachment,* particularly for individuals with dementia. Self-Determination Theory (Ryan & Deci, 2000) emphasizes the significance of *relatedness* as a fundamental need and stresses the importance of social bonds, while the Social Health Paradigm (Vernooij-Dassen & Jeon, 2016) underscores relationships and active participation in social life as key determinants of well-being. In addition to these theoretical perspectives, empirical research has consistently identified social and meaningful engagement as protective factors against loneliness and depression in both the general population (De Risio et al., 2024; Hutten et al., 2021) and older adults specifically (Liu et al., 2016; Roskoschinski et al., 2023; Wen et al., 2024; Zhao et al., 2018).

Mind and body. The findings of this thesis also highlight the role of mental, sensory, and physical stimulation in enhancing resident mood. ***Chapter 2*** demonstrated that residents who engaged in more cognitively stimulating activities reported fewer depressive symptoms than those who participated in less stimulating activities, while ***Chapter 3*** identified a number of specific activities presumably associated with cognitive engagement and potential mood improvement, such as reading, solving puzzles, and participating in discussion groups. ***Chapter 3*** also suggested the potential positive impact of physical engagement on mood and identified various forms it can take, such as physical activity (e.g., walking, chair exercises), physical contact (e.g., gentle touch, holding hands, or a reassuring pat on the shoulder), self-care, structured routines, and relaxation techniques (e.g., mindfulness, deep breathing). These findings also align with the above mentioned SPF theory (Lindenberg, 1996) and Kitwood's person-centered approach (Kitwood, 1997), which posit that, respectively, *stimulation* (for example, by adequate cognitive or physical engagement) and *occupation* (i.e., being meaningfully involved in life through action, reflection, or relaxation) serve as key mechanisms for maintaining well-being. Additionally, these findings are consistent with empirical research linking mood to physical activity (Mammen & Faulkner, 2013) and physical contact (Field, 2010).

Multiple domains. Alleviating depression in nursing home residents may thus involve fostering connection and stimulating both body and mind through various activities. Importantly, as discussed in ***Chapter 2***, many activities may relate to multiple domains; for example, group physical activities may relate to both social connectedness and bodily engagement. These observations resonate with the literature emphasizing the benefits of integrated approaches to mental health in older adults (Biering, 2019; Briggs et al., 2018; Tops et al., 2024).

Role of residents, relatives, and caregivers

The findings described in ***Chapters 2 and 3*** suggest that some residents may actively contribute to their own mental well-being, a concept closely related to agency, which has been defined as "the state of being active, usually in the service of a goal, or of having the power and capability to produce an effect or exert influence" (American Psychological Association, 2024). While residents can engage in behaviors that may positively influence their mood, this thesis also emphasizes the important role of relatives and caregivers in facilitating and supporting these efforts.

Resident agency. The findings of this thesis reinforce the idea that residents can actively contribute to their mental well-being, with support when needed. Central to this is the concept of resident agency—encompassing self-determination, freedom of action, and independence—which has been recognized as a fundamental psychological need and proposed as an extension of Kitwood's model of psychological needs (Kaufmann & Engel, 2016). This perspective is consistent with research by van Corven (2022) on the empowerment process for individuals with dementia, which suggests the importance of having a sense of choice and control in maintaining well-being. Even when cognitive or physical challenges are present, enabling residents to make choices and engage in meaningful activities could help maintain their sense of agency and positively influence their well-being.

The role of relatives and caregivers. While resident agency is important, external support can also play a role in resident mental well-being. Behavioral models proposed by Lewinsohn and colleagues (Lewinsohn, 1974) indicate that individuals with depression often experience a cycle of reduced engagement in pleasurable activities, leading to diminished positive reinforcement and further worsening of depressive symptoms. This thesis highlights the potential for relatives and caregivers to interrupt this cycle by encouraging residents to participate in meaningful activities and facilitating social interactions, thereby promoting active engagement with their environment.

These findings correspond with the concept of behavioral activation (Janssen et al., 2020; May et al., 2024), which suggests that engaging in meaningful, rewarding activities can improve mood by increasing opportunities for positive reinforcement. Because

residents with depression may struggle to initiate these activities on their own, as withdrawal and diminished interest are symptoms of depression (American Psychiatric Association, 2022), the involvement of caregivers and relatives is valuable. By recognizing their role as facilitators, they can create opportunities for residents to reconnect with enjoyable experiences, reinforcing engagement and enhancing well-being.

Importantly, the findings of ***Chapter 3*** suggest that, in addition to the specific actions of relatives and caregivers, the interpersonal manner in which care is provided likely also plays an important role. According to participants, adopting personalized, activating, and positive approaches in interactions with residents could be a relatively effective and feasible strategy for improving resident mood within the caregiving context. These insights resonate with both person-centered care (American Geriatrics Society Expert Panel on Person-Centered Care, 2016) and relationship-centered care (Nolan et al., 2004) approaches, both of which emphasize the importance of interpersonal dynamics in caregiving practices. In addition, this finding relates to the concept of empowerment in dementia care (van Corven et al., 2021), which highlights the value of supporting a person's sense of identity, choice and control, usefulness, and self-worth through their interactions with others. In this regard, relatives and caregivers can play an important role by actively creating conditions that help residents maintain or regain these feelings. This perspective is further supported by empirical research—for example, a systematic review by Anderson et al. (2016) found that empathic and humane staff interactions were associated with improved resident mood.

Impact of noticing signs of resident depression on caregiver behaviors

While earlier chapters focused on behaviors of residents, relatives, and caregivers that may influence resident mood, ***Chapter 7*** explored whether priming caregivers with information about depression in residents influences their implicit associations with mood-improving behaviors. It examined the impact of such information on caregivers' implicit attitude (reflecting the positive or negative valence they associate with these behaviors) and implicit motivation (reflecting their willingness to engage in them).

The findings suggest that caregivers may be more likely to act when they notice depressive symptoms in residents than when no symptoms are apparent. These insights align with the empathy-altruism hypothesis (Batson et al., 2015), which suggests that empathic concern—an emotional response arising from perceiving another person's well-being—stimulates altruistic motivations, driving actions aimed at alleviating their distress.

A noteworthy distinction in the findings is the potential difference between caregivers' implicit attitude and implicit motivation in response to depressive symptoms. The results suggest that while caregivers' implicit attitude does not significantly change based on resident depressive states, their implicit motivation may be more sensitive to

signaling symptoms of depression. This suggests that motivation, rather than attitude, may play a more prominent role in guiding caregivers' actual behaviors.

Research demonstrating distinctions between implicit liking (attitude) and implicit wanting (motivation) in other psychological topics seem to align with these results (Epstein et al., 2003; Hobbs et al., 2005; Koranyi et al., 2017; Robinson & Berridge, 1993). This dissociation may be understood through the concept of 'required effort' (Waugh & Gotlib, 2008), which suggests that while individuals' appreciation (liking) for rewarding behaviors tends to remain stable, their motivation (wanting) to engage in such behaviors may depend on the effort involved. Applied to caregiving, caregivers may consistently value mood-improving behaviors but require a situational trigger, such as a clear indication of depressive symptoms and the expectation that their behaviors could help reduce these symptoms in residents, to feel motivated to take supportive action.

Role of environmental factors on resident mood

In addition to behavioral strategies, environmental factors such as the physical setting (e.g., inviting spaces that encourage outdoor activities and social interaction) and social setting may contribute to resident mood (***Chapter 3***). This thesis also underscores the importance of considering how different types of stimuli may affect residents. Specifically, the study described in ***Chapter 4*** suggests that reductions in untargeted stimuli—things happening in proximity to but not intentionally directed at residents—during the COVID-19 pandemic restrictions may have contributed to an increase in depressive symptoms.

Previous research emphasizing the importance of the care setting in influencing resident mood confirms that access to nature, comfortable communal spaces, and personalized rooms can enhance resident mood (Blackler et al., 2023; Marquardt et al., 2014; Whear et al., 2014). A well-designed, safe, homey environment may not only encourage participation in activities and social interactions but also stimulate a sense of *comfort*, and thus well-being (Kitwood, 1997; Lindenberg, 1996) .

However, this thesis also suggests that the effects of environmental stimuli may vary between residents. The findings in ***Chapter 4*** indicate that residents without dementia appeared to be negatively affected by a reduction in untargeted stimuli while those with advanced dementia seemed to benefit from such reductions. These results may imply that environmental stimuli can influence residents differently, and this may depend on resident cognitive functioning.

These findings align with prior research indicating that untargeted stimuli may be particularly distressing for residents with dementia (Garcia et al., 2012; Janus et al., 2020; Lawton & Nahemow, 1973). Conversely, structured and predictable environments

have been suggested to promote a sense of security and reduce distress among these residents (Day et al., 2000). Building on this understanding, the findings of this thesis suggest that designing distinct care environments within nursing homes—with varying levels of stimulation—may help address the diverse needs of residents. This aligns with the concept of sociotherapeutic living environments, where residents are grouped into tailored settings based on their care needs and preferences regarding social and physical stimulation (Gerritsen et al., 2024). Similarly, the interest in sensory-based interventions for people with dementia (Maneemai et al., 2024; Smith & D'Amico, 2020) reflects increased attention to individual differences in sensory processing.

Measurement instruments

To facilitate the assessment of mood-improving behaviors in nursing home settings, this thesis introduces several measurement instruments. Following dual-process theory (Kahneman, 2011), two types of instruments were developed: inventories (direct measures for assessing explicitly reported mood-improving behaviors through self-report) and implicit association tasks (indirect measures of the strength of implicit associations with these behaviors).

In ***Chapter 5*****,** two inventories were introduced: the *Actions to Improve Mood by Residents* (AIM-R) and the *Actions to Improve Mood by Caregivers* (AIM-C). These inventories were designed to measure the frequency and variety of mood-improving behaviors in residents and professional caregivers, respectively. Based on the studies discussed in ***Chapters 2 and 3***, and considering principles of the inventories as discussed in ***Chapter 5***, 18 themes on which to base the new inventories were identified: *Physical activity, Contact by touching, Taking care of the appearance, Relaxation, Healthy living, Household activities, Creating something, Brain stimulation, Music, Going out, Precious memories, Stimulating the senses, Contact with others, Nature, Faith and meaning, Doing something for someone else, Security and warmth, Positive attitude*.

In addition, ***Chapter 6*** introduced the *Valence towards Behaviors to improve resident Mood IAT* (VBM-IAT) for implicit attitude (positive versus negative valence) and the *Motivation for Behaviors to improve resident mood IAT* (MBM-IAT) for implicit motivation (wanting versus not wanting) regarding caregiver mood-improving behaviors for residents. These instruments may support the growing interest in the role of automatic processes in caregiving behaviors (Manns-James, 2015; Thirsk et al., 2022).

One significant finding of this thesis concerns the limited psychometric properties of the newly developed AIM-R and AIM-C inventories. While the inventories seem to adequately capture mood-improving behaviors among both residents and caregivers, demonstrate consistent assessment over time, and may increase awareness of

potential mood-improving behaviors in nursing homes, the initial evaluations revealed shortcomings in usability, interpretability, and inter-rater agreement (for the AIM-C). These challenges are not uncommon in the development of behavioral measures, where capturing context-dependent actions through self-report or observation can be difficult (Podsakoff et al., 2003) and potentially influenced by social desirability bias (Krumpal, 2013; Paulhus, 2017). Nevertheless, the psychometric properties of the AIM-R and AIM-C inventories require further refinement and investigation to ensure their validity, reliability, and applicability in caregiving practices.

Conceptual and methodological considerations

Conceptual considerations

An important conceptual consideration in this thesis is the distinction between mood-improving behaviors and antidepressant strategies. Although these concepts are related, they might not be interchangeable. In this thesis, mood-improving behaviors are defined as everyday actions that can contribute to residents' mood. These behaviors are often informal and embedded within daily routines. In contrast, antidepressant actions refer to structured, evidence-based interventions specifically aimed at treating depression, such as psychotherapy and pharmacological treatments (Bharucha et al., 2006; Boyce et al., 2012; Burley et al., 2022; Cuijpers et al., 2021; Declercq et al., 2024; Vernooij-Dassen et al., 2010). While mood-improving behaviors may play a role in resident mood, they may not be sufficient to address the severity or full spectrum of symptoms experienced in clinical depression.

This distinction has both theoretical and practical implications. Conceptually, it suggests that mood-improving behaviors should not be perceived as replacements for formal interventions but rather as complementary strategies that may contribute to positive resident mood. Practically, this means that residents, relatives, and caregivers should be encouraged to engage in and facilitate mood-improving behaviors, but they should also be trained to recognize when formal interventions are needed. This perspective aligns with a stepped care approach for depression in nursing home residents (Gerritsen et al., 2011; Leontjevas et al., 2013), which advocates starting with the least intensive and most easily accessible interventions in case of depressive symptoms (e.g., day care program or psycho-education), while applying more specialized and intensive care (e.g., pharmacological treatment) when necessary.

Methodological considerations

This thesis has several methodological strengths, particularly in how it integrates multiple perspectives and measurement techniques. A key strength is its consideration of resident, relative, and caregiver behaviors, which may complement and reinforce

each other. Another notable strength is its focus on direct and indirect measurement instruments. This allows for the exploration of both deliberate (explicit) and intuitive (implicit) aspects of caregiving behaviors (Gawronski & De Houwer, 2014; Olson & Fazio, 2008), thus extending the scope of previous research, which has typically focused on either direct or indirect measures alone.

The use of a bottom-up approach to identify and prioritize mood-improving behaviors is another strength of this thesis. Instead of imposing predefined categories, this approach allowed behaviors to be identified from the perspectives of the residents, relatives, and caregivers themselves. This ensures that the behaviors identified are grounded in real-world experiences, making them more likely to be applicable and relevant to daily nursing home practices (Chen, 2010; Concannon et al., 2012). In addition, the active involvement of both residents and caregivers in the creation of the AIM-R and AIM-C inventories probably also strengthened the practical utility of these instruments.

Finally, the development and application of IATs specifically adapted to the nursing home context represent an innovative contribution of this thesis (Manns-James, 2015). While the IATs developed in this thesis focused on assessing caregivers' implicit attitudes and motivations regarding mood-improving behaviors for residents with or without depression, the broader application of this approach holds considerable potential for advancing the understanding of automatic processes that may influence caregiving practices. For example, previous research has shown that caregivers' explicit attitudes toward individuals with dementia are associated with variations in the quality of care provided (Evripidou et al., 2019; Parveen et al., 2022). Extending the use of IATs to explore implicit associations with, for example, supportive care practices for people with dementia or other resident populations could offer novel insights into the automatic processes that may affect daily interactions and care decisions in nursing home settings.

This thesis has several limitations that should also be considered. While the studies in this thesis identified mood-improving behaviors and developed instruments (inventories and IATs) to measure them, they did not assess the actual effects of these behaviors on resident mood or depression. Specifically, there is a gap in understanding whether performing the identified behaviors relates to actual changes in resident mood or depression. Future studies could address this by exploring whether these behaviors lead to changes in resident mood, and whether these effects are sustained over time.

In addition, a formative model was selected to measure the construct of mood-improving behaviors, as this approach is appropriate when a construct is conceptually constituted by its indicators rather than reflecting a single underlying trait (Bollen & Diamantopoulos, 2017; Edwards & Bagozzi, 2000; Fried, 2017). This approach offers

flexibility, as it allows for the representation of constructs composed of diverse and potentially unrelated indicators. However, this choice also comes with limitations. While formative models are useful for capturing the broad nature of a construct and for providing practical insights, they also introduce methodological constraints. Unlike reflective models, which assume that observed indicators are manifestations of an underlying latent variable, formative models treat indicators as defining components of the construct. As a result, a composite score is not conceptually appropriate, and each item must therefore be evaluated independently. This has important implications for analysis and interpretation: traditional psychometric techniques such as internal consistency and factor analysis are not appropriate, and findings must be interpreted at the level of individual indicators (Bollen & Diamantopoulos, 2017). Although this limits the simplicity of summarizing the construct in a single score, it may more accurately reflect the heterogeneous and multidimensional nature of mood-improving behaviors.

Regarding the IATs developed and used in this thesis, the outcome measures were limited to implicit associations with behaviors. It is important to distinguish between implicit associations and the behaviors themselves because the relationship between the two is not one-to-one, given the multicausality of behavior (Glanz et al., 2015; Meissner et al., 2019). In particular, automatic tendencies to perform behaviors can be overruled by intentional cognitions, depending on the specific circumstances (Houlihan, 2018; Strack & Deutsch, 2004). Physical and contextual cues—such as a resident's appearance, facial expression, or other observable characteristics—can also influence actual behavior (Houlihan, 2018). Future studies could investigate whether these implicit associations translate into tangible actions and, ultimately, whether those actions have a meaningful impact on resident mood.

Additionally, in terms of implicit associations with mood-improving behaviors, this thesis focuses solely on caregivers. Nevertheless, relatives and residents may also hold implicit attitudes or motivations—for example, perceptions of caregiving practices, their own roles within the care relationship, or their capacity to engage in supportive behaviors—that may, in turn, influence participation, interactions, and mood. Exploring such implicit associations through IATs or other indirect measurement instruments could provide additional insights into how automatic processes may influence behavior and mood.

Indirect measurement instruments may particularly have potential in populations where communication about explicit cognitions is limited—for example, for residents with advanced dementia. In such cases, these instruments can offer alternative ways to access attitudes, tendencies, or motivations that individuals may find difficult to express verbally. One promising approach for exploring implicit motivation is the Pavlovian-instrumental Transfer (PIT) paradigm (Custers et al., 2025; Mahlberg et al., 2021; Talmi et al., 2008). This paradigm aims to examine whether cues that were

previously associated with a positive outcome (e.g., a pleasant image or sound) can later influence a person's tendency to act, even when the outcome is no longer available. In a typical PIT task, participants first learn that a neutral cue (e.g., a square) predicts a positive outcome, while another cue (e.g., a circle) does not. Separately, they learn that performing a simple action (e.g., squeezing a handgrip) also leads to the same outcome. In the final phase, no outcomes are provided, but the cues are shown again. Increased responding to the cue that previously signaled a positive outcome is assumed as a sign of implicit motivation for the outcome the action once produced.

The PIT paradigm may be particularly relevant in nursing homes settings because it can be adapted to involve simple actions and minimal instructions. When combined with stimuli representing mood-improving behaviors as the positive outcome, PIT could offer a novel way to assess implicit motivation (wanting) for such behaviors. Broadening the use of indirect measurement instruments could therefor contribute to a more complete understanding of motivation and relational dynamics in nursing homes and support the development or refinement of tailored interventions aimed at improving resident mood.

A final limitation of this thesis is its broad focus on nursing home residents, without fully accounting for potential variability across different resident groups (e.g., those with or without dementia). Although some exploratory attention was given to possible group differences in the psychometric properties of the AIM inventories and the influence of environmental factors, formal statistical testing was not feasible. Future research could build on these initial observations by examining whether the applicability and relevance of the developed instruments, the role of environmental influences, and the effects of identified mood-improving behaviors differ across resident groups.

Implications and recommendations for practice, education, future research

Practice

The findings of this thesis underscore the apparent importance of mood-improving behaviors and the involvement of relatives and caregivers in supporting resident mood. Particularly, the results highlight the importance of social connectedness, cognitive engagement, and physical stimulation, with relatives and caregivers having an important role in enabling and encouraging these behaviors in daily practice.

The AIM-R and AIM-C inventories developed in this thesis offer practical tools for identifying and implementing mood-improving behaviors in nursing homes. While these instruments require further refinement before broad implementation, they may offer promising opportunities to structure conversations about meaningful daily activities, support individual care planning, and contribute to refining existing

depression management programs in nursing homes, such as *"Act in case of Depression"* (Gerritsen et al., 2011; Leontjevas et al., 2013).

In addition to supporting mood improvement, these inventories could also help caregivers develop a deeper understanding of individual residents. By identifying specific behaviors that align with each resident's unique preference and needs, caregivers can tailor their approaches to provide personalized care. Over time, these instruments might also serve as an evaluation tool, allowing caregivers to assess the effectiveness of different mood-improving strategies and refine care approaches accordingly.

Education

Educational programs for both professional caregivers and those in training could emphasize the important role caregivers play in supporting resident mood, while also considering the potential impact of environmental factors for resident mood. Integrating these elements into caregiver education can help ensure that mood-improving behaviors become an embedded part of daily practice rather than isolated interventions. Additionally, training programs could focus on the use of the AIM-R and AIM-C inventories (once further refined), enabling caregivers to systematically identify, apply, and evaluate mood-improving strategies as part of routine care.

Another area of focus relates to the findings from ***Chapter 7,*** which suggest that signaling resident depressive symptoms may increase caregiver implicit motivation for mood-improving behaviors. This suggests that raising awareness of recognizing depressive symptoms could serve as an entry point for enhancing caregiving practices. Training programs may therefore focus on strengthening the ability of caregivers to observe, interpret, and respond to signs of emotional distress. By developing or refining these interpersonal and emotional attunement skills, caregivers may provide more timely, proactive, and personalized interventions, potentially preventing the escalation of more severe depressive symptoms. These recommendations align with existing research underscoring the value of early detection and intervention in addressing depressive symptoms in nursing home residents (Leontjevas et al., 2013; Seitz et al., 2010). In addition to professional caregivers, involving and supporting relatives in recognizing early signs of depression could enhance responsiveness and contribute to better mental health outcomes for residents.

Future research

The findings of this thesis indicate several directions for future research to further refine and expand on the work presented. One focus could be the continued refinement of the AIM-R and AIM-C inventories to improve their psychometric properties and usability in daily care practices. Future studies could refine these tools by incorporating additional

data sources, such as observational data or proxy reports, particularly for residents with severe cognitive decline who may have difficulty reflecting on their actions or communicating about their behaviors. In addition, evaluating these instruments—including the IATs—in diverse cultural contexts, countries, and care settings could strengthen their generalizability and applicability across different populations. As nursing home populations in the Netherlands become increasingly diverse (Vellekoop et al., 2024), it is important to consider whether cultural factors influence the way mood-improving behaviors are expressed and perceived.

Future research could also broaden the scope by further exploring the role of relatives and co-residents in supporting resident mood, and by developing both direct and indirect measurement instruments for relatives, as well as indirect instruments for residents. Relatives often play an important role in the well-being of residents, yet their contributions remain underexamined (Hovenga et al., 2022; Ryan & McKenna, 2015). Exploring how they facilitate social connection, cognitive engagement, and physical stimulation could provide a better understanding of mood improvement in nursing homes. Similarly, co-residents—who may offer companionship and informal support—represent an understudied but potentially important source of emotional and social enrichment (Bergland & Kirkevold, 2008). Understanding the dynamics of peer relationships within nursing homes, such as how co-residents may influence each other's participation in activities, could offer further directions for improving mood and well-being in later life.

In addition to including more stakeholder groups, future research could explore the dynamics between residents, professional caregivers, relatives, and co-residents and their influence on mood-improving behaviors. Exploring how these different stakeholders behave, communicate, and divide responsibilities could help identify strategies for establishing a positive caregiving environment.

Future studies could also investigate how broader institutional and policy factors may influence mood-improving practices. Nursing home policies, staffing levels, care models (e.g., traditional nursing homes, small-scale living environments), and cultural differences in caregiving norms and expectations may impact the extent to which social engagement, cognitive stimulation, and physical activity are integrated into daily routines.

Another promising direction for research involves exploring the implicit motivation of caregivers and their influence on caregiving behaviors. ***Chapter 7*** highlighted that priming caregivers with information about resident depressive symptoms may affect implicit motivation, but further research could explore whether different types of information (different narratives about depression or resident characteristics) can affect caregivers' behavioral responses.

Additionally, future studies could explore how caregivers' individual experiences with depression or their beliefs about its treatability affect their willingness to engage in mood-improving activities. If caregivers hold negative attitudes toward depression or feel unable to influence resident mood, they may struggle to offer the emotional engagement and responsiveness needed. These biases, whether implicit or explicit, can interfere with interpersonal behaviors and ultimately impact resident mood.

Finally, to strengthen the evidence base for mood-improving behaviors, future research could prioritize longitudinal and experimental studies to investigate causal relationships between mood-improving behaviors and resident outcomes. Longitudinal studies that monitor residents over time could allow researchers to assess whether sustained engagement in social, cognitive, and physical activities leads to long-term improvements in resident mood or well-being. Additionally, experimental studies could compare different intervention strategies to determine which approaches are most effective for whom and under what conditions.

Conclusions

The studies described in this thesis contribute to a better understanding of mood-improving behaviors in nursing homes by identifying key strategies, describing the roles of residents, caregivers, and relatives, and introducing practical tools for measuring mood-improving behaviors (the AIM-R and AIM-C inventories), along with implicit association tasks to assess caregivers' implicit attitude and motivation regarding these behaviors (the VBM-IAT and MBM-IAT, respectively). The findings suggest the importance of social engagement, cognitive stimulation, and physical activity for resident mood, while also highlighting the key role of relatives and caregivers in facilitating these processes. Additionally, this thesis sheds light on the potential impact of caregivers noticing signs of depression in residents on their implicit motivation to engage in mood-improving behaviors and the possible influence of environmental factors on resident mood. Although the measurement instruments require further refinement, they offer promise for enhancing caregiving practices. Further research could focus on strengthening the psychometric properties of these instruments, exploring the impact of mood-improving behaviors across different resident populations, and investigating the broader organizational and cultural factors that may influence caregiving dynamics. Ultimately, integrating mood-improving behaviors into daily nursing home care may contribute to a more person-centered and supportive environment, enhancing resident mood and well-being.

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Appendices

Samenvatting in het Nederlands (summary in Dutch)

Inleiding en doel van het proefschrift

Veel bewoners van een woonzorghuis hebben te maken met somberheid of depressie. Dit kan komen door lichamelijke klachten, verlies van zelfstandigheid of een kleiner wordend sociaal netwerk. Depressieve klachten hebben niet alleen invloed op hoe iemand zich voelt, maar beïnvloeden ook het welbevinden in brede zin en het dagelijks functioneren. Daarnaast kunnen deze klachten zorgen voor extra druk op de zorg. Tegelijkertijd zijn woonzorghuizen plekken waar bewoners, naasten en zorgverleners (zorgmedewerkers en behandelaren) elkaar dagelijks ontmoeten. In die interacties kan bepaald gedrag positief bijdragen aan hoe bewoners zich voelen.

Dit proefschrift richt zich op gedrag dat de stemming van mensen die in een woonzorghuis wonen kan verbeteren. Het gaat om helpend gedrag van bewoners zelf, maar ook van hun naasten en zorgverleners. Daarbij wordt gekeken naar gedrag dat mensen bewust inzetten, én naar hoe zorgmedewerkers onbewust reageren op dit soort gedrag.

Er is onderzocht welk gedrag de stemming van bewoners positief kan beïnvloeden en hoe dat gedrag gemeten kan worden. Er zijn twee soorten meetinstrumenten ontwikkeld: vragenlijsten die bewust gedrag in kaart brengen, en computertaken die juist iets kunnen zeggen over onbewuste reacties.

Ook is onderzocht of de onbewuste reacties van zorgmedewerkers anders zijn wanneer zij weten dat een bewoner depressieve klachten heeft of een officiële depressiediagnose. De vraag daarbij is of deze informatie hun onbewuste houding (*attitude*) en motivatie beïnvloedt ten opzichte van gedrag dat de stemming van bewoners kan verbeteren. Op deze manier draagt dit proefschrift bij aan een beter begrip van gedrag dat het welbevinden van bewoners kan ondersteunen, en biedt het aanknopingspunten voor verbetering van depressiezorg in woonzorghuizen.

De uitbraak van de COVID-19 pandemie bood daarnaast een onverwachte mogelijkheid om de invloed van omgevingsprikkels op het gedrag en de stemming van bewoners te onderzoeken. Door de toenmalige sluiting van de woonzorghuizen veranderde de aard en hoeveelheid prikkels in de leefomgeving: bezoek werd beperkt, activiteiten vielen weg en er was minder bedrijvigheid. Dit bood de kans om te bestuderen hoe zulke veranderingen in de omgeving invloed kunnen hebben op bewoners. Daarom wordt in dit proefschrift, naast individueel gedrag, ook gekeken naar de mogelijke rol van omgevingsprikkels.

Methode en resultaten

Deel 1: Gedrag dat stemming kan beïnvloeden en omgevingsprikkels

Het eerste deel van dit proefschrift richt zich op gedrag van bewoners, naasten en zorgverleners dat de stemming van bewoners kan verbeteren, en op de invloed van omgevingsprikkels op het gedrag en de stemming van bewoners.

In ***Hoofdstuk 2*** werd onderzocht welke kenmerken van activiteiten samenhangen met depressieve klachten bij bewoners van somatische afdelingen van woonzorghuizen. In een longitudinaal onderzoek werden 40 bewoners driemaal door een onderzoeker bevraagd – bij aanvang, en opnieuw na vier en acht maanden – over hun stemming en over activiteiten die zij in de voorgaande week hadden ondernomen. Daarbij werd niet gekeken naar activiteiten als geheel, maar naar verschillende kenmerken van een activiteit. Een groepsactiviteit met bewegen, bijvoorbeeld, bevat zowel een lichamelijk als sociaal element. In totaal werden vijf kenmerken van activiteiten onderzocht: lichamelijke inspanning, creativiteit, sociaal contact, cognitieve stimulatie (zoals nadenken) en muziek.

De resultaten lieten zien dat deelname aan activiteiten met een hoog sociaal of cognitief gehalte samenhing met minder depressieve klachten, vergeleken met activiteiten met een laag niveau van deze kenmerken. Vooral sociaal contact bleek belangrijk: het verband daarvan met depressieve klachten bleef ook zichtbaar wanneer rekening gehouden werd met andere kenmerken van de activiteit.

Hoofdstuk 3 beschrijft twee studies waarin gebruik is gemaakt van een methode genaamd *group concept mapping*. Hiermee werd systematisch in kaart gebracht welk gedrag bewoners, naasten en zorgverleners inzetten om de stemming van bewoners te verbeteren. In de eerste studie (N = 124) werd gekeken naar gedrag van bewoners zelf; in de tweede studie (N = 110) naar gedrag van naasten en zorgverleners. In beide studies gaven bewoners, naasten en zorgverleners input. De deelnemers leverden ideeën aan voor gedrag dat de stemming van bewoners kan verbeteren en beoordeelden de verwachte impact en haalbaarheid ervan. De verschillende gedragingen werden door experts gegroepeerd.

Volgens de deelnemers droegen bewoners vooral bij aan hun stemming door sociale interacties aan te gaan en betekenisvolle activiteiten te ondernemen. Naasten en zorgverleners konden volgens deelnemers vooral bijdragen door persoonlijke aandacht te geven, bewoners aan te moedigen om actief te blijven, positief en vriendelijk te zijn, en te zorgen voor een warme, huiselijke sfeer.

Hoofdstuk 4 gaat over de invloed van de omgeving op het gedrag van bewoners tijdens de COVID-19 pandemie. In een online vragenlijst onderzoek gaven 199 behandelaren hun mening over hoe veranderingen in omgevingsprikkels tijdens de pandemie samenhingen met verschillende vormen van probleemgedrag bij bewoners. Er werd onderscheid gemaakt tussen *gerichte prikkels* (zoals georganiseerde activiteiten) en *ongerichte prikkels* (zoals achtergrondgeluiden), *en* tussen bewoners zonder dementie, met milde dementie en met gevorderde dementie.

Volgens de behandelaren was de afname van ongerichte prikkels geassocieerd met een *toename* van depressief en apathisch gedrag, en met een *afname* van psychotisch en geagiteerd gedrag. Bij bewoners zonder dementie leek het ondergaan van minder prikkels samen te hangen met *meer* probleemgedrag, terwijl dit gedrag bij bewoners met gevorderde dementie juist leek af te nemen bij minder prikkels. Deze bevindingen wijzen erop dat omgevingsprikkels verschillende effecten kunnen hebben op specifieke groepen bewoners en typen probleemgedrag.

Deel 2: Het meten van gedrag en onbewuste houding en motivatie

Het tweede deel van dit proefschrift gaat over het meten van gedrag dat kan bijdragen aan een betere stemming van bewoners in een woonzorghuis. Er zijn twee soorten instrumenten ontwikkeld: vragenlijsten voor het meten van bewust gedrag van bewoners en zorgmedewerkers, en computertaken voor het meten van onbewuste associaties van zorgmedewerkers bij dit gedrag.

Hoofdstuk 5 beschrijft de ontwikkeling en evaluatie van twee vragenlijsten: de *Actions to Improve Mood by Residents* (AIM-R) en de *Actions to Improve Mood by Caregivers* (AIM-C). De AIM-R richt zich op gedrag dat bewoners zelf inzetten om zich beter te voelen. De AIM-C richt zich op gedrag van zorgmedewerkers dat kan bijdragen aan een betere stemming van bewoners. De vragenlijsten brengen in kaart welk gedrag wordt toegepast, hoe vaak dit gebeurt en welk effect de invuller verwacht op de stemming van bewoners.

De vragenlijsten werden ontwikkeld samen met bewoners en zorgmedewerkers. De inhoud werd beoordeeld op bruikbaarheid en relevantie (*inhoudsvaliditeit*) door 31 bewoners (AIM-R) en 35 zorgmedewerkers (AIM-C). Om de betrouwbaarheid van de vragenlijsten te toetsen is onderzocht in hoeverre antwoorden bij herhaling overeenkwamen (*test-hertest betrouwbaarheid;* AIM-R: N = 206, AIM-C: N = 125), en of verschillende zorgmedewerkers het gedrag op dezelfde manier beoordeelden (*interbeoordelaarsbetrouwbaarheid;* AIM-C: N = 81). Ook werd de toepasbaarheid in de praktijk onderzocht via semigestructureerde interviews.

De meeste deelnemers beoordeelden de inhoud van de vragenlijsten als bruikbaar en relevant. De antwoorden kwamen grotendeels overeen bij herhaling. Tegelijkertijd kwamen er ook aandachtspunten naar voren: sommige vragen werden als moeilijk ervaren, en zorgmedewerkers verschilden soms in hun oordeel over hoe vaak bepaald gedrag voorkwam en welk effect dat gedrag heeft op de stemming van bewoners. Volgens de deelnemers kunnen de instrumenten stimuleren om stil te staan bij gedrag dat vaak niet als 'interventie' wordt gezien, maar wel helpend kan zijn. De vragenlijsten kunnen zo aanknopingspunten bieden voor gesprekken in zorgteams of met bewoners over wat werkt voor wie. Wel is verdere verfijning nodig voordat brede toepassing mogelijk is.

Hoofdstuk 6 richt zich op de ontwikkeling en evaluatie van twee computertaken, zogenoemde *Implicit Association Tasks* (IATs). Deze taken zijn bedoeld om onbewuste associaties van zorgmedewerkers te meten bij gedrag dat de stemming van bewoners kan verbeteren. De eerste taak, de *Valence towards Behaviors to improve resident Mood IAT* (VBM-IAT), meet of zorgmedewerkers onbewust positief of negatief denken over dit gedrag. De *Motivation for Behaviors to improve resident Mood IAT* (MBM-IAT) meet in hoeverre zorgmedewerkers onbewust gemotiveerd lijken om het gedrag toe te passen. Tijdens de taken krijgen deelnemers afbeeldingen te zien van handelingen van zorgmedewerkers die een bewoner kunnen helpen zich beter te voelen, aangevuld met afbeeldingen die algemeen als positief of negatief worden beoordeeld. Deelnemers worden geïnstrueerd om deze afbeeldingen zo snel mogelijk in te delen in categorieën (*'positief'* versus *'negatief'* en *'wil ik'* versus *'wil ik niet'*).

Zorgmedewerkers beoordeelden de gebruikte afbeeldingen op *inhoudsvaliditeit* (N = 35). Ook werd gekeken hoe gemakkelijk deelnemers de afbeeldingen konden indelen in categorieën (N = 230). Daarnaast werd getest hoe goed de afbeeldingen bij elkaar pasten (*interne consistentie*) (N = 230) en werd de *test-hertest betrouwbaarheid* (N = 91) van de taken onderzocht. Tevens werd gekeken in hoeverre de uitkomsten samenhingen met verwante begrippen zoals zelf-gerapporteerde attitude ten aanzien van depressie, of juist *niet* met niet-verwante begrippen zoals sociaal wenselijkheid (respectievelijk *convergente* en *discriminante validiteit*; N = 111).

De VBM-IAT en de MBM-IAT toonden adequate *inhoudsvaliditeit, interne consistentie* en *discriminante validiteit*. De afbeeldingen konden redelijk goed worden ingedeeld in de juiste categorieën, al was er nog ruimte voor verbetering. De *test-hertest betrouwbaarheid* en *convergente validiteit* bleken matig. Ondanks deze beperkingen bieden de ontwikkelde computertaken mogelijkheden voor verkennend onderzoek naar onbewuste associaties die zorgmedewerkers hebben bij gedrag dat de stemming van bewoners kan beïnvloeden. Zulke associaties kunnen van invloed zijn op hun bereidheid om dit gedrag in de praktijk toe te passen.

Deel 3: Effect van het aanbieden aan zorgmedewerkers van informatie over depressie bij een bewoner

Het derde deel van dit proefschrift onderzoekt of informatie over depressie bij bewoners invloed heeft op de onbewuste houding en motivatie van zorgmedewerkers ten aanzien van gedrag dat bewoners kan ondersteunen om zich beter te voelen.

Hoofdstuk 7 beschrijft een experimentele studie met zorgmedewerkers in woonzorghuizen. In deze studie lazen zij korte beschrijvingen van bewoners (*vignetten)* waarin stond dat een bewoner a) geen depressieve klachten had, b) *wel* depressieve klachten had (zonder diagnose), of c) depressieve klachten had *en* een officiële depressiediagnose.

Na elk vignet voerden de zorgmedewerkers de twee computertaken uit ***Hoofdstuk 6*** uit: de VBM-IAT voor onbewuste houding, en de MBM-IAT voor onbewuste motivatie voor gedrag dat de stemming van een bewoner kan verbeteren. De deelnemers voerden de taken drie keer uit, met telkens een maand ertussen. Het aantal deelnemers per meetmoment was respectievelijk 119, 85 en 81.

De resultaten lieten meer onbewuste motivatie zien voor gedrag dat de stemming van een bewoner kan verbeteren, wanneer zorgmedewerkers de vignetten hadden gelezen waarin depressieve klachten werden genoemd, in vergelijking met het vignet waarin dit niet het geval was. Het wel of niet aanwezig zijn van een diagnose in het vignet leek deze motivatie niet te beïnvloeden. Er werd geen verschil gevonden in onbewuste houding, ongeacht het wel of niet aanwezig zijn van depressieve klachten of een diagnose in het vignet.

Deze bevindingen suggereren dat zorgmedewerkers mogelijk sneller geneigd zijn in actie te komen als ze depressieve klachten bij bewoners opmerken. Dit onderschrijft het belang van alertheid bij hen op signalen van somberheid.

Integratie van de bevindingen

De bevindingen uit dit proefschrift geven meer inzicht in gedrag dat de stemming van woonzorghuisbewoners kan beïnvloeden. Sommige bewoners kunnen zelf iets doen om hun stemming te verbeteren, bijvoorbeeld door mee te doen aan activiteiten die zij prettig of belangrijk vinden. Voor anderen is dit moeilijker. Dan zijn naasten en zorgverleners extra belangrijk.

Op basis van de resultaten lijken er drie gedragsgebieden te zijn die kunnen bijdragen aan een betere stemming van bewoners. Ten eerste lijkt *verbinding* belangrijk: sociaal contact en betekenisvolle activiteiten. Dat kan bijvoorbeeld gaan om contact met anderen, betrokkenheid bij de omgeving of een gevoel van verbinding met zichzelf.

Ten tweede lijkt *mentale stimulatie* belangrijk. Dit zijn bijvoorbeeld activiteiten waarbij bewoners nadenken of zich ergens op richten, zoals lezen, herinneringen ophalen of luisteren naar muziek. Tot slot kunnen activiteiten helpen die het *lichaam* stimuleren, bijvoorbeeld beweging, ontspanning of prikkels voor de zintuigen. Veel activiteiten raken meerdere van deze drie gebieden tegelijk.

Naast gedrag lijkt ook de omgeving een rol te spelen. Geluiden, inrichting en sfeer kunnen beïnvloeden hoe prettig bewoners zich voelen. Maar wat voor de één fijn is, kan voor een ander juist te veel zijn. Het is daarom belangrijk om goed te kijken wat past bij een individuele bewoner. Verschillende soorten woonomgevingen – rustig of juist activerend – zijn hierbij mogelijk helpend.

Verder laat dit proefschrift zien dat zorgmedewerkers onbewust meer gemotiveerd lijken om helpend gedrag toe te passen als zij weten dat een bewoner zich somber voelt. Dat maakt het belangrijk dat zij signalen van somberheid tijdig opmerken.

Implicaties voor de praktijk

De resultaten uit dit proefschrift kunnen bijdragen aan het verbeteren van de dagelijkse zorg in woonzorghuizen. Zorgmedewerkers spelen een belangrijke rol bij het opmerken, ondersteunen en stimuleren van gedrag dat bewoners kan helpen zich beter te voelen. Kleine handelingen, zoals een vriendelijk praatje of samen een activiteit doen, kunnen al een positieve invloed hebben.

Ook de omgeving – zoals geluid, sfeer en inrichting – kan invloed hebben op hoe iemand zich voelt. Het verminderen van storend omgevingsgeluid of het creëren van een bepaalde sfeer kan bijdragen aan het welbevinden van bewoners. Het is daarom belangrijk dat zorgmedewerkers zich bewust zijn van deze omgevingsfactoren. Wat bewoners nodig hebben verschilt, dus het is belangrijk om goed te kijken wat een bewoner prettig vindt en wat past bij diens situatie.

De twee ontwikkelde vragenlijsten (AIM-R en AIM-C) kunnen bijdragen aan inzicht in gedrag dat de stemming van bewoners kan verbeteren. De vragenlijsten kunnen ook het gesprek stimuleren, bijvoorbeeld binnen zorgteams of samen met de bewoner, over wat werkt voor wie. Zo kunnen zorgmedewerkers hun aanpak beter afstemmen op wat iemand nodig heeft.

Ook in opleidingen en cursussen voor zorgmedewerkers kunnen de resultaten van dit proefschrift een plek krijgen. Thema's zoals het herkennen van somberheid, het bewust inzetten van helpend gedrag, en de invloed van de omgeving op hoe bewoners zich voelen verdienen hierin aandacht.

Het is belangrijk om te benadrukken dat helpend gedrag geen vervanging is voor professionele behandeling van depressie. Wel kan het bijdragen aan het verminderen van somberheid en mogelijk helpen om een depressie te voorkomen. Bij depressieve klachten is het echter belangrijk om ook passende interventies te overwegen, zoals psycho-educatie, een klachtgericht activiteitenplan, psychotherapie of medicijnen.

Mogelijkheden voor vervolgonderzoek

Vervolgonderzoek is nodig om de meetinstrumenten verder te verbeteren, en om te kijken of ze goed werken bij verschillende groepen bewoners. Ook is meer kennis nodig over de daadwerkelijke impact van bepaald gedrag op de stemming van bewoners, zeker ook op de langere termijn.

Daarnaast kan onderzocht worden hoe zorgorganisaties het gebruik van gedrag dat bijdraagt aan stemming kunnen stimuleren. Het kan ook waardevol zijn om de rol van naasten en medebewoners verder te onderzoeken zodat zij een constructieve bijdrage aan de stemming van bewoners kunnen leveren. Verder is het interessant om ook vragenlijsten en computertaken te ontwikkelen voor andere doelgroepen, zoals naasten. Bij bewoners met gevorderde dementie kan het interessant zijn om te onderzoeken of en hoe computertaken – in aangepaste vorm – kunnen worden ingezet om inzicht te krijgen in hun wensen en behoeften.

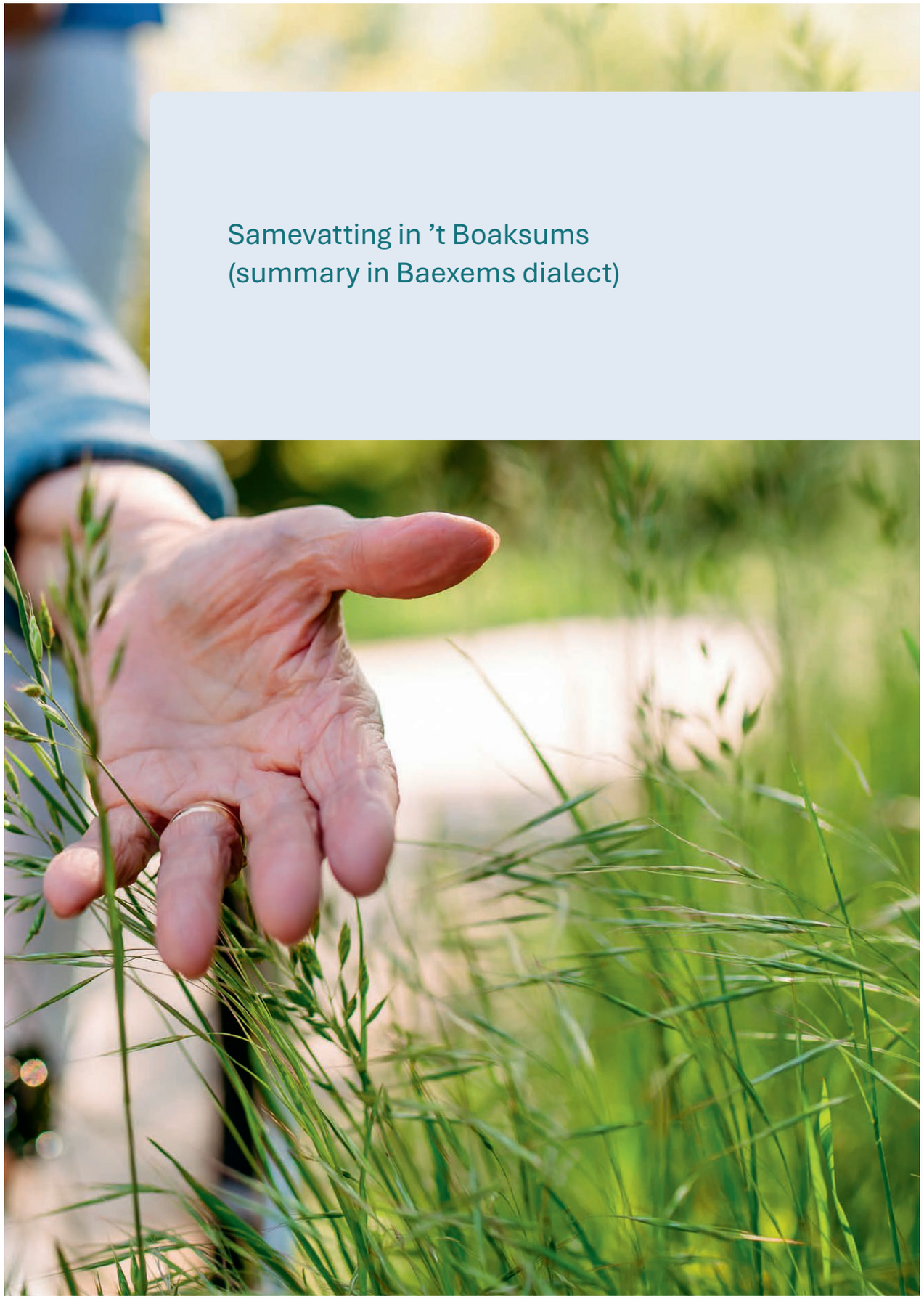
Conclusie

Dit proefschrift draagt bij aan de kennis over gedrag dat de stemming van bewoners in een woonzorghuis positief kan beïnvloeden. Het laat zien welk gedrag mogelijk helpend is, welke rol bewoners, naasten, zorgverleners en de omgeving daarin spelen, en hoe dit gedrag gemeten kan worden.

De bevindingen wijzen erop dat vooral verbinding, mentale stimulatie en lichamelijke activering kunnen bijdragen aan een betere stemming, en dat zowel bewoners zelf als hun omgeving hierin een rol kunnen spelen. Daarnaast laat dit onderzoek zien dat informatie over depressieve klachten bij bewoners de onbewuste motivatie van zorgmedewerkers kan versterken om helpend gedrag toe te passen. Ook komt naar voren dat omgevingsfactoren van invloed kunnen zijn op hoe bewoners zich voelen.

Hoewel de daadwerkelijke impact van gedrag op stemming in dit proefschrift beperkt is onderzocht, bieden de bevindingen aanknopingspunten voor de praktijk. De inzichten kunnen worden geïntegreerd in bestaande programma's voor depressiezorg, en de ontwikkelde meetinstrumenten kunnen zowel verder onderzoek als de toepassing van helpend gedrag ondersteunen. Zo levert dit proefschrift niet alleen nieuwe

kennis op, maar ook praktische hulpmiddelen om het welbevinden van bewoners in woonzorghuizen te ondersteunen.



Samevatting in ’t Boaksums
(summary in Baexems dialect)

Inleiding en doel van ‘t proofsjrift

Vööl bewoeaners van un woeanzorghoés höbbe te make mèt somberheid of depressie. Dit kin kómme door liéflikke klachte, verlees van zelfsjtenjigheid of un kleiner wearendj sociaal netwèrk. Depressieve klachte höbbe neet allein invloed op wie emes zig veultj, mer beïnvloede ouch ut welbevinje in breije zin en ‘t dageliks functionere. Doaneave kinne dees klachte zörge vöär extra drök oppe zorg. Teageliékertiéd zeen woeanzorghoéze plekke woea bewoeaners, noaste en zorgverleners (zorgmedewèrkers en behanjelieëre) mekaar dageliks teagekómme. In die interacties kin bepaaldj gedraag positief biejdrage aan wie bewoeaners zig veule.

Dit proofsjrift richtj zig op gedraag det de sjtömming van minse die in un woeanzorghoés woeane kin verbeatere. Ut geit óm helpendj gedraag van bewoeaners zelf, mer ouch van höär noaste en zorgverleners. Doabiej weardj gekeake noa gedraag det minse bewusjt inzètte, én noa wie zorgmedewèrkers ónbewusjt reagere op dit soart gedraag.

D’r is óngerzochtj welk gedraag de sjtömming van bewoeaners positief kin beïnvloede en wie det gedraag gemeate kin weare. D’r zeen twieë soarte meatinstrumente óntwikkeldj: vroagelieëste die bewusjt gedraag in kaart bringe, en computertake die juust iets kinne zègke öäver ónbewustje reacties.

Ouch is óngerzochtj of de ónbewusjte reacties van zorgmedewèrkers anges zeen wenieër ze weite det unne bewoeaner depressieve klachte heat of un officiële depressiediagnose. De vroag doabiej is of dees informatie höär ónbewusjte hoajing (*attitude*) en motivatie beïnvloedj ten opzigte van gedraag det de sjtömming van bewoeaners kin verbeatere. Zoea draagtj dit proofsjrift biej aan beater begrip van gedraag det ut welbevinje van bewoeaners kin óngersjteune, en beedj ut aanknoupingspuntje vöär verbeatering van depressiezorg in woeanzorghoéze.

De oétbraak van de COVID-19 pandemie boaj doaneave un ónverwachte möägelikheid óm de invloed van ómgeavingsprikkels op ut gedraag en de sjtömming van bewoeaners te óngerzeuke. Door de toenmalige sjloéting van de woeanzorghoéze verangerdje de aard en de hoevöälheid prikkels inne leafómgeaving: bezeuk weardje beperktj, activiteite vele weg en d’r waas minder bedriévigheid. Dit boaj de kans óm te besjtudere wie zulke verangeringe in de ómgeaving invloed kinne höbbe op bewoeaners. Doaróm weardj in dit proofsjrift, neave individueel gedraag, ouch gekeake noa de möägelike rol van ómgeavingsprikkels.

Methode en resultate

Deil 1: Gedraag det sjtömming kin beïnvloede en ómgeavingsprikkels

Ut ieërste deil van dit proofsjrift richtj zig op gedraag van bewoeaners, noaste en zorgverleners det de sjtömming van bewoeaners kin verbeatere, en op de invloed van ómgeavingsprikkels op ut gedraag en de sjtömming van bewoeaners.

In ***Hoofdstuk 2*** weardje óngerzochtj welke kinmerke van activiteite samenhange mèt depressieve klachte biej bewoeaners van somatische aafdeilinge van woeanzorghoéze. In un longitudinaal óngerzeuk weardje 40 bewoeaners driej kieër door unne óngerzeuker bevroagdj – biej aanvang, en opnoew noa veer en acht moandj – öäver hun sjtömming en öäver activiteite die ze in de vöärgoandje weak haje óngernomme. Doabiej weardje neet gekeake noa activiteite as gehieël, mer noa versjillendje kinmerke van un activiteit. Un groepsactiviteit mèt beweage, bevöärbeeldj, bevatj zoeawaal un liéflik as sociaal element. In totaal weardje viéf kènmerke van activiteite óngerzochtj: liéflike insjpanning, creativiteit, sociaal contact, cognitieve stimulatie (zoeawie noadinke) en meziék.

De resultate lete zeen det deilname aan activiteite mèt un hoeag sociaal of cognitief gehalte samehing mèt minder depressieve klachte, vergeleake mèt activiteite mèt un lieëg niveau van dees kinmerke. Vööral sociaal contact bleak belangriék: ut verbandj doavan mèt depressieve klachte bleaf ouch zichtbaar wenieër reakening gehoaje weardje mèt angere kinmerke van de activiteit.

Hoofdstuk 3 besjrieftj twieë sjtudies woea-in gebroék is gemaaktj van un mèthode genaamdj *group concept mapping*. Hiejmèt weardje systematisch in kaart gebrachtj welk gedraag bewoeaners, noaste en zorgverleners inzètte óm de sjtömming van bewoeaners te verbeatere. In de ieërste sjtudie (N = 124) weardje gekeake noa gedraag van bewoeaners zelf; in de twieëdje sjtudie (N = 110) noa gedraag van noaste en zorgverleners. In beide sjtudies goave bewoeaners, noaste en zorgverleners input. De deilnimmers leverdje ideje aan vöär gedraag det de sjtömming van bewoeaners kin verbeatere en beoordeildje de verwachtje impact en hoalbaarheid d’rvan. De versjillende gedraginge weardje door experts gegroepeerdj.

Volges de deilnimmers droge bewoeaners vööral biej aan höär sjtömming door sociale interacties aan te goan en beteikenisvolle activiteite te óndernimme. Noaste en zorgverleners kóste volges deilnimmers vööral biejdrage door persuënlike aandacht te geave, bewoeaners aan te moedige óm actief te bliéve, positief en vrundjelik te zeen, en te zorgen vöär un werme, hoéselike sfeer.

Hoofdstuk 4 geit öäver de invloed van de ómgeaving op ut gedraag van bewoeaners tiéjes de COVID-19 pandemie. In un online vroagelieëst óngerzeuk goave 199 behanjelieëre höär meining öäver wie verangeringe in ómgeavingsprikkels tiejes de pandemie samehinge mèt versjillendje vorme van probleemgedraag biej bewoeaners. D'r weardje ónderscheid gemaaktj tösse *gerichtje prikkels* (zoeawie georganiseerde activiteite) en *óngerichtje prikkels* (zoeawie achtergróndjgeluide), en tösse bewoeaners zónger dementie, mèt milde dementie en mèt gevorderde dementie.

Volges de behanjelieëre waas de aafname van óngerichte prikkels geassocieerdj mèt un *toename* van depressief en apathisch gedraag, en mèt un *aafname* van psychotisch en geagiteerd gedraag. Biej bewoeaners zónger dementie leak ut óngergoan van minder prikkels same te hange mèt *mieër* probleemgedraag, terwieël dit gedraag biej bewoeaners mèt gevorderde dementie juust leak aaf te nimme biej minder prikkels. Dees bevinjinge wiéze d'rop det ómgeavingsprikkels versjillende effecte kinne höbbe op specifieke groepe bewoeaners en type probleemgedraag.

Deil 2: Ut meate van gedraag en ónbewustje hoajing en motivatie

Ut twieëdje deil van dit proofsjrift geit öäver ut meate van gedraag det kin biejdrage aan un beatere sjtömming van bewoeaners in un woeanzorghoés. D'r zeen twieë soarte instrumente óntwikkeldj: vroagelieëste vöär ut meate van bewusjt gedraag van bewoeaners en zorgmedewèrkers, en computertake vöär ut meate van ónbewusjte associaties van zorgmedewèrkers biej dit gedraag.

Hoofdstuk 5 besjrieftj de óntwikkeling en evaluatie van twieë vroagelieëste: de *Actions to Improve Mood by Residents* (AIM-R) en de *Actions to Improve Mood by Caregivers* (AIM-C). De AIM-R richtj zig op gedraag det bewoeaners zelf inzètte om zig beater te veule. De AIM-C richtj zig op gedraag van zorgmedewèrkers det kin biejdrage aan un beatere sjtömming van bewoeaners. De vroagelieëste bringe in kaart welk gedraag weardj toegepasjt, wie vaak dit geböärtj en welk effect de invöller verwachtj op de sjtömming van bewoeaners.

De vroagelieëste weardje óntwikkeldj same mèt bewoeaners en zorgmedewèrkers. De inhoud weardje beoordeildj op broékbaarheid en relevantie (*inhoudsvaliditeit*) door 31 bewoeaners (AIM-R) en 35 zorgmedewèrkers (AIM-C). Óm de betroewbaarheid van de vroagelieëste te toetse, is óngerzochtj in wieverre antjwoarde biej herhaling öävereinkwome (*test-hertest betroewbaarheid*; AIM-R: N = 206, AIM-C: N = 125), en of versjillendje zorgmedewèrkers ut gedraag op dezelfdje meneer beoordeildje (*interbeoordelaarsbetroewbaarheid*; AIM-C: N = 81). Ouch weardje de toepasbaarheid in de praktijk óngerzochtj via semigestructureerde interviews.

De meiste deilnimmers beoordeildje de inhoud van de vroagelieëste as broékbaar en relevant. De antjwoarde kwome groeatendeils öäverein biej herhaling. Tegeliékertiéd kwome d'r ouch aandachtspuntje noa vöäre: sommige vroage weardje as lestig ervare, en zorgmedewèrkers versjildje soms in höär oordeil öäver wie vaak bepaaldj gedraag vöärkwoom en welk effect det gedraag heat op de sjtömming van bewoeaners. Volges de deilnimmers kinne de instrumente stimulere óm sjtil te stoan biej gedraag det vaak neet as 'interventie' weardj gezeen, mer waal helpendj kin zeen. De vroagelieëste kinne zoea aanknoupingspuntje beje vöär gesjprekke in zorgteams of mèt bewoeaners öäver waat wèrktj vöär weam. Waal is verdere verfiéning nuëdig vöärdet breije toepassing möägelik is.

Hoofdstuk 6 richtj zig op de óntwikkeling en evaluatie van twieë computertake, zoeagenumdje *Implicit Association Tasks* (IATs). Dees take zeen bedoeldj óm onbewusjte associaties van zorgmedewèrkers te meate biej gedraag det de sjtömming van bewoeaners kin verbeatere. De ieërste taak, de *Valence towards Behaviors to improve resident Mood IAT* (VBM-IAT), mètj of zorgmedewèrkers ónbewusjt positief of negatief dinke öäver dit gedraag. De *Motivation for Behaviors to improve resident Mood IAT* (MBM-IAT) mètj in wieverre zorgmedewèrkers ónbewusjt gemotiveerd liéke óm ut gedraag toe te passen. Tiejes de take kriége deilnimmers pleatjes te zeen van hanjelinge van zorgmedewèrkers die unne bewoeaner kinne helpe zig beater te veule, aangevöldj mèt pleatjes die algemein as positief of negatief weare beoordeildj. Deilnimmers weare geïnstrueerdj óm dees pleatjes zoea sjnel möägelik in te delen in categorieje ('*positief*' versus '*negatief*' en '*wil ig*' versus '*wil ig neet*').

Zorgmedewèrkers beoordeildje de gebroékdje pleatjes op *inhoudsvaliditeit* (N = 35). Ouch weardje gekeake wie gemekkelik deilnimmers de pleatjes kóste indeile in categorieje (N = 230). Doaneave weardje getesjt wie good de pleatjes biej elkaar pasjte (*interne consistentie*) (N = 230) en weardje de *test-hertest betroewbaarheid* (N = 91) van de take óngerzochtj. Ouch weardje gekeake in wieverre de oétkómste samehinge mèt verwantje begrippe zoeawie zelf-gerapporteerdje attitude ten aanzeen van depressie, of juust *neet* mèt neet-verwante begrippe zoeawie sociaal winselikheid (respectievelijk *convergente* en *discriminante validiteit*; N = 111).

De VBM-IAT en de MBM-IAT toeandje adequate *inhoudsvaliditeit*, *interne consistentie* en *discriminante validiteit*. De pleatjes kóste redelik good weare ingedeildj in de juuste categorieje, al waas d'r nog ruumtje vöär verbeatering. De *test-hertest betroewbaarheid* en *convergente validiteit* bleake matig. Óndanks dees beperkinge beje de óntwikkeldje computertake möägelikheje vöär verkinnendj óngerzeuk noa ónbewustje associaties die zorgmedewèrkers höbbe biej gedraag det de sjtömming van bewoeaners kin beïnvloede. Zulke associaties kinne van invloed zeen op höär bereidheid óm dit gedraag in de praktijk toe te passen.

Deil 3: Effect van ut aanbeje aan zorgmedewèrkers van informatie öäver depressie biej unne bewoeaner

Ut derdje deil van dit proofsjrift óngerzeukt of informatie öäver depressie biej bewoeaners invloed heat op de ónbewustje hoajing en motivatie van zorgmedewèrkers ten aanzeen van gedraag det bewoeaners kin óndersjteune óm zig beater te veule.

Hoofdstuk 7 besjrieftj un experimentele sjtudie mèt zorgmedewèrkers in woeanzorghoéze. In dees sjtudie loze ze korte besjriévinge van bewoeaners (*vignette*) woea-in sjtóng det unne bewoeaner a) gein depressieve klachte haaj, b) *waal* depressieve klachte haaj (zónger diagnose), of c) depressieve klachte haaj *en* un officiële depressiediagnose.

Noa elk vignet veurdje de zorgmedewèrkers de twieë computertake oét ***Hoofdstuk 6*** oét: de VBM-IAT vöär ónbewustje hoajing, en de MBM-IAT vöär ónbewustje motivatie vöär gedraag det de sjtömming van unne bewoeaner kin verbeatere. De deilnimmers veurdje de take driej kieër oét, mèt sjteeds unne moandj d'r tösse. Ut aantal deilnimmers per meatmoment waas respectievelik 119, 85 en 81.

De resultate lete mieër ónbewustje motivatie zeen vöär gedraag det de sjtömming van unne bewoeaner kin verbeatere, weniëer zorgmedewèrkers de vignetten haje geleaze woea-in depressieve klachte weardje genumdj, in vergeliéking mèt ut vignet woea-in dit neet ut geval waas. Ut waal of neet aanwezig zeen van un diagnose in ut vignet leak dees motivatie neet te beïnvloede. D'r weardje gein versjil gevónje in onbewustje hoajing, óngeacht ut waal of neet aanwezig zeen van depressieve klachte of un diagnose in ut vignet.

Dees bevinjinge suggerere det zorgmedewèrkers möägelik sjneller geneigdj zeen in actie te kómme as ze depressieve klachte biej bewoeaners opmerke. Dit óngersjrieftj ut belang van alertheid biej höär op signale van somberheid.

Integratie van de bevinjinge

De bevinjinge oét dit proofsjrift geave mieër inzicht in gedraag det de sjtömming van woeanzorghoésbewoeaners kin beïnvloede. Sommige bewoeaners kinne zelf iets doon óm höär sjtömming te verbeatere, bevöärbeeldj door mèt te doon aan activiteite die ze prettig of belangriék vinje. Vöär angere is dit lestiger. Den zeen noaste en zorgverleners extra belangriék.

Op basis van de resultate liéke d'r driej gedraagsgebiede te zeen die kinne biejdrage aan un betere sjtömming van bewoeaners. Ten ieërste liéktj *verbinjing* belangriék: sociaal contact en beteikenisvolle activiteite. Det kin bevöärbeeldj goan óm contact

mèt angere, betrókkeheid biej de ómgeaving of un geveul van verbinjing mèt zigzelf. Ten twieëdje liektj *mentale stimulatie* belangriék. Dit zeen bevöärbeeldj activiteite woeabiej bewoeaners noadinke of zig örges op richte, zoeawie leaze, herinneringe ophoale of loéstere noa meziék. Tot sjlot kinne activiteite helpen die ut *lichaam* sjtimulere, bevöärbeeldj beweaging, óntsjpanning of prikkels vöär de zintuge. Vöäl activiteite rake mieërdere van dees driej gebiede tegeliék.

Neave gedraag liéktj ouch de ómgeaving un rol te sjpele. Geluide, inrichting en sfeer kinne beïnvloede wie prettig bewoeaners zig veule. Mer waat vöär de ein fijn is, kin vöär unne angere juust te vöäl zeen. Ut is doaróm belangriék óm good te kiéke waat pasjt biej unne individuele bewoeaner. Versjillendje soarte woeanómgeavinge – röstig of juust activerend – zeen hiejbiej möägelik helpendj.

Verder luëtj dit proofsjrift zeen det zorgmedewèrkers ónbewustj mieër gemotiveerd liéke óm helpendj gedraag toe te passen als ze weite det unne bewoeaner zig somber veultj. Det maaktj ut belangriék det ze signale van somberheid tiejig opmerke.

Implicaties vöär de praktijk

De resultate oét dit proofsjrift kinne biejdrage aan ut verbeatere van de dagelijkse zorg in woeanzorghoéze. Zorgmedewèrkers sjpele un belangriéke rol biej ut opmerke, óngersjteune en sjtimulere van gedraag det bewoeaners kin helpen zig beater te veule. Kleine hanjelinge, zoeawie un vrundjelik pröätje of same un activiteit doon, kinne al unne positieve invloed höbbe.

Ouch de ómgeaving – zoeawie geluid, sfeer en inrichting – kin invloed höbbe op wie emes zig veultj. Ut vermindere van sjtuërendj ómgeavingsgeluid of ut creëren van un bepaalde sfeer kin biejdrage aan ut welbevinje van bewoeaners. Ut is doaróm belangriék det zorgmedewèrkers zig bewusjt zeen van dees ómgeavingsfactore. Waat bewoeaners nuëdig höbbe versjiltj, dus ut is belangriék om good te kiéke waat unne bewoeaner prettig vindj en waat pasjt biej zién situatie.

De twieë óntwikkeldje vroagelieësten (AIM-R en AIM-C) kinne biejdrage aan inzicht in gedraag det de sjtömming van bewoeaners kin verbeatere. De vroagelieëste kinne ouch ut gesjprek stimulere, bevöärbeeldj binne zorgteams of same mèt de bewoeaner, öäver waat wèrktj vöär weam. Zoea kinne zorgmedewèrkers höäre aanpak beater aafsjtömme op wat emes nuëdig heat.

Ouch in opleidinge en cursusse vöär zorgmedewèrkers kinne de resultate van dit proofsjrift un plek kriége. Thema's zoeawie ut herkinne van somberheid, ut bewustj inzètte van helpendj gedraag, en de invloed van de ómgeaving op wie bewoeaners zig veule verdene hiej-in aandacht.

Ut is belangriék óm te benoadrökke det helpendj gedraag gein vervanging is vöär professionele behanjeling van depressie. Waal kin ut biejdrage aan ut vermindere van somberheid en möägelik helpe óm un depressie te vöärkómme. Biej depressieve klachte is ut echter belangriék óm ouch passendje interventies te öäverweage, zoeawie psycho-educatie, un klachtgerichtj activiteiteplan, psychotherapie of mediciéne.

Möägelikheje vöär vervolgóngerzeuk

Vervolgóngerzeuk is nuëdig óm de meatinstrumente verder te verbeatere, en óm te kiéke of ze good wèrke biej versjillendje groepe bewoeaners. Ouch is mieër kinnes nuëdig öäver de daadwerkelike impact van bepaaldj gedraag op de sjtömming van bewoeaners, zeker ouch op de langere termién.

Doaneave kin óngerzochtj weare wie zorgorganisaties ut gebroék van gedraag det biejdraagt aan sjtömming kinne sjtimulere. Ut kin ouch waardevol zeen óm de rol van noaste en medebewoeaners verder te óngerzeuke zoeadet ze un constructieve biejdrage aan de sjtömming van bewoeaners kinne levere. Verder is ut interessant óm ouch vroagelieëste en computertake te óntwikkele vöär angere doelgroepe, zoeawie noaste. Biej bewoeaners mèt gevorderdje dementie kin ut interessant zeen óm te óngerzeuke of en wie computertake – in aangepasjte vorm – kinne weare ingezatte om inzicht te kriége in höär winse en behoefte.

Conclusie

Dit proofsjrift draagtj biej aan de kinnes öäver gedraag det de sjtömming van bewoeaners in un woeanzorghoés positief kin beïnvloede. Ut luëtj zeen welk gedraag möägelik helpendj is, welke rol bewoeaners, noaste, zorgverleners en de ómgeaving doa-in sjpele, en wie dit gedraag gemeate kin weare.

De bevinjinge wiéze d'r op det vööral verbinjing, mentale stimulatie en liéflike activering kinne biejdrage aan un beatere sjtömming, en det zoeawaal bewoeaners zelf als höär ómgeaving hiej-in un rol kinne sjpele. Doaneave luëtj dit óngerzeuk zeen det informatie öäver depressieve klachte biej bewoeaners de ónbewustje motivatie van zorgmedewèrkers kin versjterke óm helpendj gedraag toe te passe. Ouch kumptj noa vööre det ómgeavingsfactore van invloed kinne zeen op wie bewoeaners zig veule.

Hoewaal de daadwèrkelike impact van gedraag op sjtömming in dit proofsjrift beperktj is óngerzochtj, beje de bevinjinge aanknoupingspuntje vöär de praktijk. De inzichte kinne weare geïntegreerdj in besjtoandje programma's vöär depressiezorg, en de óntwikkeldje meatinstrumente kinne zoeawaal verder óngerzeuk as de toepassing van helpendj gedraag óngersjteune. Zoea levertj dit proofsjrift neet allein noewe kinnes op, mer ouch praktische hulpmiddele óm ut welbevinje van bewoeaners in woeanzorghoéze te óngersjteune.

Data management

The studies presented in this thesis were conducted as part of a Master's thesis project at the Open University (Chapter 2) and the Junior Researcher Project 2019 at Radboud University Medical Center, Radboud Institute for Health Sciences (Chapters 3, 5, 6, and 7); reference number: 2019-159; DIAS: *Enriching personalized depression care by learning from successfully used Deliberated and Intuitive Antidepressant Strategies in nursing homes*). Chapter 4 was initiated in response to the COVID-19 pandemic.

All studies involved human subjects and were conducted in accordance with the principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and the ethical guidelines applicable in the Netherlands (all chapters), as well as in Belgium (Chapter 5). Participants were informed about the study through information letters, and where needed, oral explanations.

To ensure participant privacy, all studies implemented pseudonymization. The pseudonymization key was securely stored separately from the research data on a protected network drive, accessible only to authorized project members. Data storage followed the Findable (F) and Accessible (A) aspects of the FAIR principles (Wilkinson et al., 2016).

Chapter 2

The study was reviewed by the Research Ethics Committee (cETO) of the Open University (reference number: U2016/06589/FRO), which determined that it was not subject to the Medical Research Involving Human Subjects Act (WMO) and provided a positive ethical judgment. All participants provided written informed consent for data collection and processing, and potential future research use of anonymized data.

Data were collected through structured face-to-face interviews with nursing home residents by a single researcher (Inge Knippenberg), who recorded responses on paper and subsequently entered them into LimeSurvey (LimeSurvey Project Team and Schmitz, 2015). Additional data were obtained from an elderly care physician and integrated into the dataset. Statistical analyses were performed using IBM SPSS version 22 (IBM Corporation., 2013).

Paper-based consent forms and recorded responses are securely stored for 15 years from the date of the final measurement for the last participant (December 8, 2017) in the locked archive of OASIS (location: Echt, the Netherlands), the archiving service of the Open University. Access is restricted to designated employees responsible for archiving and the project manager (dr. Ruslan Leontjevas). Anonymized data and analysis code are available at https://osf.io/jbc6k/.

Chapter 3

We received ethical clearance from the Ethics Committee of the Radboud University Nijmegen Medical Centre (reference number: 2019-5464) who determined that this study was not subject to the WMO. All participants provided written or online informed consent for data collection and processing. Future use of these data requires renewed participant permission.

Data from nursing home residents, relatives, and professional caregivers were collected both online using LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) and the Concept Systems Global MAX^{tm} software (2019), as well as on paper through self-reported questionnaires and structured face-to-face interviews by researchers (Ine Declercq and Inge Knippenberg). Paper-based responses were later entered into LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) and Concept Systems Global MAX^{tm} software (2019) by the researchers. Data analyses were performed using Global MAX^{TM} software (2019) and IBM SPSS version 25 (IBM Corporation., 2017).

Paper-based consent forms and written questionnaires are securely stored for 15 years after the study's completion (February 2, 2021) in the locked central archive of Radboudumc in Nijmegen. Access is restricted to designated employees responsible for archiving and the project manager (prof. dr. Debby Gerritsen).

The data underlying Chapter 3 is not suitable for reuse. The data, materials, and analysis code are under closed access and will be stored for 15 years after the study's completion in a Data Acquisition Collection (DAC) of the Radboud Data Repository: https://doi.org/10.34973/xddb-gf93.

Chapter 4

According to Dutch law and applicable regulations, this online questionnaire study among professionals did not fall under the scope of the WMO and therefore did not require review by an accredited MREC or the CCMO (CCMO, 2020). All participants provided online informed consent for data collection and processing, with future use of the data requiring renewed participant permission.

Data from nursing home professionals were collected through an online questionnaire administered via LimeSurvey (LimeSurvey Project Team and Schmitz, 2015). Responses to closed-ended questions were analyzed using IBM SPSS version 25 (IBM Corporation., 2017), while open-ended responses were analyzed using ATLAS.ti version 8 (ATLAS.ti Scientific Software Development GmbH, 2020).

The data underlying Chapter 4 is not suitable for reuse. The data, materials, and analysis code have been placed under closed access and will be archived for 15 years from the start of the retention period (January 22, 2021) in a DAC of the Radboud Data Repository: https://doi.org/10.34973/xddb-gf93.

Chapter 5

This study adhered to the legal and ethical frameworks of both the Netherlands and Belgium and received ethical clearance from the CMO Radboudumc (the Netherlands, reference number: 2021-11047) and the CME VUB (Belgium, reference numbers: EC-2021-277 and EC-2021-432). All participants provided written or online informed consent for data collection and processing, including consent for future research use of anonymized data.

Data from nursing home residents and professional caregivers were collected online through LimeSurvey (LimeSurvey Project Team and Schmitz, 2015), and on paper through self-reported questionnaires and face-to-face interviews conducted by researchers (Ine Declercq, Marijke Akkerman, Marissa Bauwens, Merle Borremans – the Bruin, Karin Fleuren, Ellis Vermeule, and Inge Knippenberg). Paper-based responses were subsequently entered into LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) by one of the researchers. Data were analyzed using IBM SPSS version 27 (IBM Corporation., 2020) and R (R Core team., 2022).

Written questionnaires and paper-based consent forms are securely stored for 15 years after the study's completion (December 9, 2022) in the locked Radboudumc central archive, Nijmegen. Access is restricted to designated employees responsible for archiving and the project manager (prof. dr. Debby Gerritsen). The data, materials, and analysis code are under closed access and will be stored for 15 years after the study's completion in a DAC of the Radboud Data Repository: https://doi.org/10.34973/xddb-gf93.

Chapter 6 and 7

The Radboud Ethics Committee confirmed that these studies were not subject to the WMO (reference number: 2021-11047). All participants provided online informed consent for data collection, processing, and future research use of anonymized data.

Data collection was facilitated using the secured O4U research platform (Slot, 2023), which facilitated the administration of online questionnaires via LimeSurvey (LimeSurvey Project Team and Schmitz, 2015) and computer-based reaction tasks developed through Lab.js (Henninger et al., 2022)). Data were analyzed using IBM SPSS version 27 (Chapter 6) and 29 (Chapter 7) (IBM Corporation., 2020, 2022).

Relevant research documentation will be securely stored after the PhD defense, for 15 years following the last measurement of the final participant (November 25, 2023) in the Radboudumc department server. Anonymized data, materials, and analysis code are available at https://osf.io/ywdjq/. Access to stored documentation is restricted to designated archiving staff and the project manager (prof. dr. Debby Gerritsen).

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Ook dank aan de overige co-auteurs van de artikelen in dit proefschrift: **Christian Bakker**, **Raymond Koopmans**, **Hanneke Nijsten**, **Anke Persoon**, **Jennifer Reijnders**, **Slavi Stoyanov**, **Peter Verboon**, **Hester Vermeulen** en **Patricia De Vriendt**. Fijn dat ik met jullie mocht samenwerken en dank voor jullie waardevolle input op de opzet van de studies en de bijbehorende artikelen.

Verder wil ik de leden van de manuscriptcommissie, **prof. dr. Anne Speckens**, **prof. dr. Martin Smalbrugge** en **prof. dr. Peter de Jong** hartelijk danken voor het kritisch lezen en

beoordelen van het proefschrift. Tevens dank aan de leden van de promotiecommissie voor het deelnemen aan de oppositie.

En dan dichter bij huis:

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Geert, tijdens de verbouwing van ons huis, op momenten dat ik nogal kritisch was over mijn schilderkwaliteiten, vertelde je me een mooi gezegde. Een gezegde dat mij ook heeft geholpen bij het schrijven van dit proefschrift. Ja, er zullen onverhoopt type- of spelfoutjes in staan en het kan altijd beter, maar: "*Emes dea blindj is, waas bliej as d'r ut kós zeen*".

Pap en mam, jullie hebben ons altijd gestimuleerd onze eigen weg te kiezen. En als je dan ergens voor hebt gekozen, daar de verantwoordelijkheid voor te nemen en er iets van te maken. Dank voor jullie interesse gedurende het traject *en* voor de vele hulp in en om huis. Dankzij jullie ligt alles er altijd netjes bij!

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Lieve mensen: **dank jullie wel!**

Inge, mei 2025

Over de auteur
(about the author in Dutch)

Inge Knippenberg werd geboren op 18 maart 1988 in Baexem. In 2006 behaalde ze haar havo-diploma aan Scholengemeenschap Sint Ursula in Horn. Na een korte periode Ergotherapie te hebben gestudeerd aan Zuyd Hogeschool in Heerlen, stapte ze over naar de hbo-opleiding Toegepaste Psychologie aan Fontys Hogeschool in Eindhoven. Tijdens het schrijven van haar afstudeerscriptie bij Worldworks Training & Coaching in Ven-Zelderheide groeide haar interesse in wetenschappelijk onderzoek.

Na haar afstuderen in 2011 werkte Inge als onderzoeksassistent en data-analist bij het Instituut voor Zorgoptimalisatie (INSZO, voorheen Meetpunt Kwaliteit) in Eindhoven en Utrecht. Tegelijkertijd volgde ze de wo-opleiding Psychologie aan de Open Universiteit in Heerlen, waar ze in 2018 cum laude afstudeerde in de richting Klinische Psychologie. Haar afstudeerscriptie, uitgevoerd in samenwerking met het Universitair Kennisnetwerk Ouderenzorg Nijmegen (UKON), resulteerde in een wetenschappelijke publicatie en een posterpresentatie op het *19th International Psychogeriatric Association (IPA) Congress* in Santiago de Compostela, Spanje.

Tussen 2017 en 2019 was Inge werkzaam als onderzoeker, eerst bij de afdeling Anesthesiologie, Pijn en Palliatieve Geneeskunde van het Radboudumc in Nijmegen en daarna bij de vakgroep Gezondheidspsychologie van de Open Universiteit. In 2019 startte ze haar promotieonderzoek bij het UKON en de afdeling Eerstelijnsgeneeskunde van het Radboudumc, in samenwerking met de Open Universiteit.

Naast haar promotieonderzoek was Inge van 2020 tot 2024 werkzaam als docent bij de faculteit Psychologie van de Open Universiteit, waar ze onderwijs gaf bij de vakgroep Theorie, Methoden en Statistiek.

Sinds juni 2025 werkt Inge als psycholoog bij Archipel in de regio Eindhoven.

List of publications

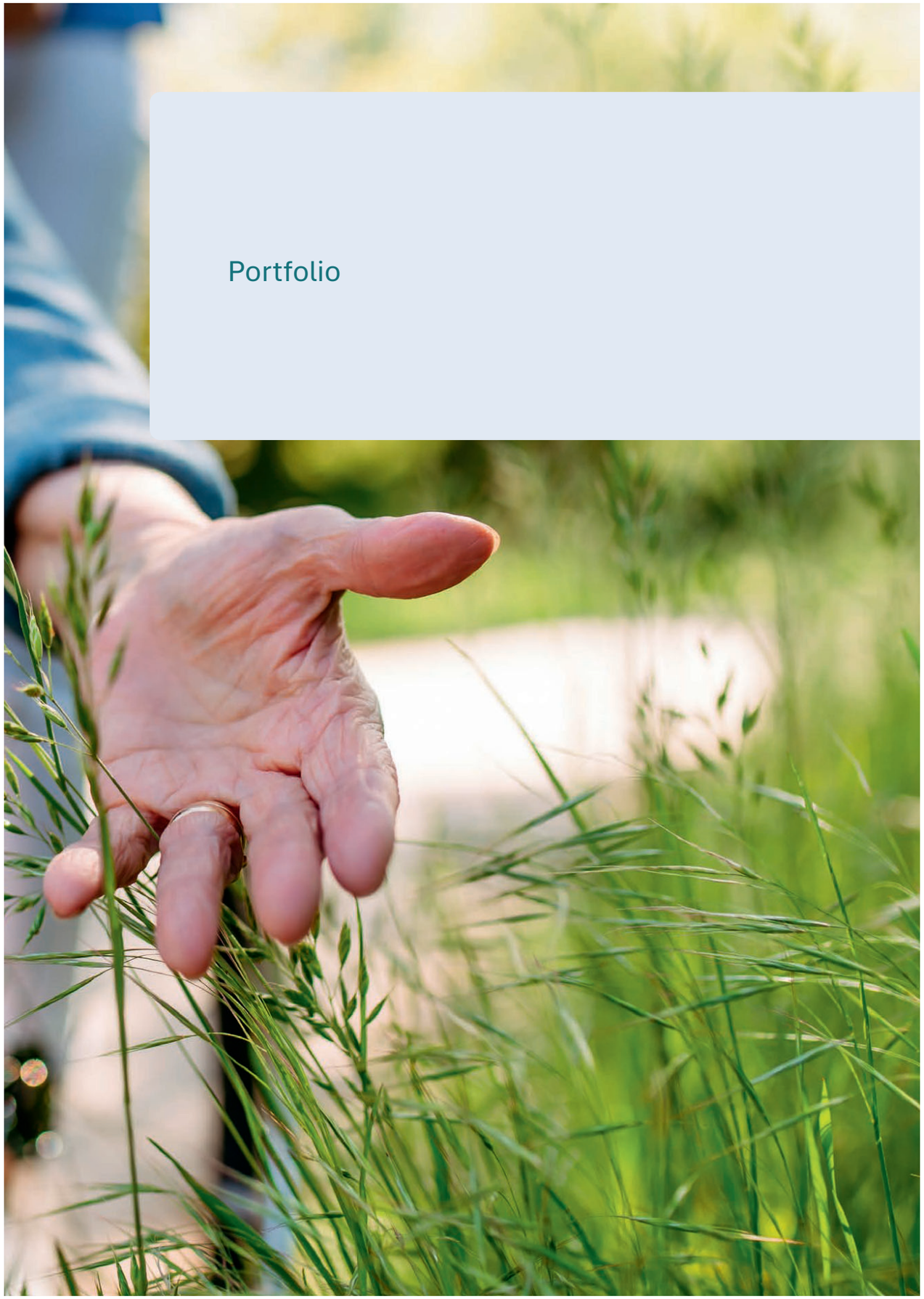
Listed in this thesis

- **Knippenberg, I.**, Leontjevas, R., Declercq, I., van Lankveld, J., & Gerritsen, D. (**2025**). Measuring implicit associations with behaviours to improve resident mood: development of implicit association tasks for nursing home care providers. *International journal of nursing studies advances, 8,* 100292. https://doi.org/10.1016/j.ijnsa.2025.100292
- **Knippenberg, I.**, Leontjevas, R., Stoyanov, S., Persoon, A., Verboon, P., Vermeulen, H., van Lankveld, J., & Gerritsen, D. (**2023**). Informal antidepressant strategies for nursing home residents: two group concept mapping studies. *Aging & mental health, 27*(2), 251–262. https://doi.org/10.1080/13607863.2022.2057427
- **Knippenberg, I.**, Leontjevas, R., Nijsten, J., Bakker, C., Koopmans, R., & Gerritsen, D. (**2022**). Stimuli changes and challenging behavior in nursing homes during the COVID-19 pandemic. *BMC geriatrics, 22*(1), 142. https://doi.org/10.1186/s12877-022-02824-y
- **Knippenberg, I.**, Reijnders, J., Gerritsen, D., & Leontjevas, R. (**2021**). The association between specific activity components and depression in nursing home residents: the importance of the social component. *Aging & mental health, 25*(1), 118–125. https://doi.org/10.1080/13607863.2019.1671312
- **Knippenberg, I.**, Leontjevas, R., Declercq, I., de Vriendt, P., Persoon, A., Verboon, P., van Lankveld, J., & Gerritsen, D. (**under review**). Mapping mood-improving behaviors in nursing homes: development and evaluation of the Actions to Improve Mood inventories.
- **Knippenberg, I.**, Leontjevas, R., Declercq, I., van Lankveld, J., & Gerritsen, D. (**under review**). Priming nursing home caregivers with information about resident depression status: effects on implicit attitude and motivation regarding behaviors to improve resident mood.

Other publications

- **Knippenberg, I.**, Leontjevas, R., Declercq, I., van Lankveld, J., De Vriendt, P., & Gerritsen, D. (**2024**). Agreement between nursing home caregivers' observations of residents' depression, well-being, and quality of life. *International psychogeriatrics*, *36*(8), 694–696. https://doi.org/10.1017/S1041610223000741
- **Knippenberg, I.**, Zaghouli, N., Engels, Y., Vissers, K., & Groot, M. (**2023**). Severe mental illness and palliative care: patient semistructured interviews. *BMJ supportive & palliative care, 13*(3), 331–337. https://doi.org/10.1136/bmjspcare-2019-002122
- Leontjevas, R., **Knippenberg, I.**, Bakker, C., Koopmans, R., & Gerritsen, D. (**2022**). Werken op afstand en gebruik van onlinecommunicatie in verpleeghuizen tijdens COVID-19-maatregelen [Remote work and the use of online communication in nursing homes during COVID-19-measures]. *Tijdschrift voor gerontologie en geriatrie, 53*(2), 10.36613/tgg.1875-6832/2022.02.01. https://doi.org/10.36613/tgg.1875-6832/2022.02.01

- Leontjevas, R., **Knippenberg, I.**, Bakker, C., Koopmans, R., & Gerritsen, D. (**2021**). Telehealth and telecommunication in nursing homes during COVID-19 antiepidemic measures in the Netherlands. *International psychogeriatrics, 33*(8), 835–836. https://doi.org/10.1017/S1041610221000685
- Leontjevas, R., **Knippenberg, I.**, Smalbrugge, M., Plouvier, A., Teunisse, S., Bakker, C., Koopmans, R., & Gerritsen, D. (**2021**). Challenging behavior of nursing home residents during COVID-19 measures in the Netherlands. *Aging & mental health, 25*(7), 1314–1319. https://doi.org/10.1080/13607863.2020.1857695
- **Knippenberg, I.** (**2015**). Invloed van autonomieondersteuning op motivatie om te bewegen. *Student Undergraduate Research E-Journal!*, *1*. https://journals.open.tudelft.nl/sure/article/view/1038
- Declercq, I., Leontjevas, R., **Knippenberg, I.**, van Hooren, S., De Vriendt, P., & Gerritsen, D. (**under review**). Best practice in the management of depression in Dutch and Flemish nursing homes: what can we learn from daily practice?
- Krause, R., **Knippenberg, I.**, Bolman, C., Peels, D., Prats Lopez, M., & Lechner, L. (**submitted**). Factors associated with social media use among community-dwelling older adults.
- Krause, R., **Knippenberg, I.**, Bolman, C., Peels, D., Prats Lopez, M., & Lechner, L. (**submitted**). Associations between loneliness, psychological well-being, and social media use among older adults: the moderating role of social cohesion.



Portfolio

Name: Inge Knippenberg
Department: Primary and Community care
PhD period: 01/05/2019 – 30/03/2025
PhD Supervisor(s): prof. dr. D.L. Gerritsen and prof. dr. J.J.D.M. van Lankveld
PhD Co-supervisor(s): dr. R. Leontjevas

Training activities	Hours
Courses	
• Concept Systems Incorporated, Ithaca, New York, United States (Online) (2019)	1.00
· *An Introduction to Group Concept Mapping and Groupwisdom™*	
• Radboud University, Nijmegen, the Netherlands (2019)	15.00
· *Radboud Institute for Health Sciences (RIHS) Introduction course for PhD candidates*	
• Radboud University, Nijmegen, the Netherlands (2019)	28.00
· *Writing a Review Article*	
• Radboud University, Nijmegen, the Netherlands (2020)	84.00
· *Scientific Writing for PhD candidates*	
• Open University, Heerlen, the Netherlands (Online) (2020)	140.00
· *Test- en Toetstheorie*	
• Open University, Heerlen, the Netherlands (Online) (2020)	66.00
· *Various partial certificates for the University Teaching Qualification (Basis Kwalificatie Onderwijs, BKO)*	
• Radboudumc, Nijmegen, the Netherlands (Online) (2021)	28.00
· *Scientific Integrity*	
• Examination Board EMWO, on behalf of the NFU BROK committee, Utrecht, the Netherlands (Online) (2021)	5.00
· *Re-registration Basic course for clinical investigators (Basiscursus Regelgeving en Organisatie voor Klinisch Onderzoekers, BROK)*	
• Radboud University, Nijmegen, the Netherlands (Online) (2021)	51.00
· *Presenting and Poster Pitching*	
• Radboud University, Nijmegen, the Netherlands (Online) (2022)	75.00
· *Effective Writing Strategies*	
• Examination Board EMWO, on behalf of the NFU BROK committee, Utrecht, the Netherlands (Online) (2024)	5.00
· *Re-registration Basic course for clinical investigators (Basiscursus Regelgeving en Organisatie voor Klinisch Onderzoekers, BROK)*	
Seminars	
• Alzheimer Café Leudal, Heythuysen, the Netherlands (2020)	4.00
· *Oral presentation: Dementie en somberheid*	
• Young Researcher Network meeting (Online) (2021)	9.00
· *Oral presentation: Environmental stimuli in nursing homes during the COVID-19 pandemic: Lessons learned to improve the management of challenging behavior*	
• Themamiddag Archipel, Eindhoven, the Netherlands (Online) (2021)	10.00
· *Oral presentation with Charlotte van Corven: Wet- en regelgeving wetenschappelijk onderzoek*	
• Lunch meeting Open University, Heerlen, the Netherlands (Online) (2022)	8.00
· *Oral presentation with Alma Brand and Peter Reniers: Group Concept Mapping*	
• Welbevinden bijeenkomst, University Knowledge network for Older adult care Nijmegen (UKON), Nijmegen, the Netherlands (2023)	5.00
· *Oral presentation: To agree or not to agree*	
• Samenscholing Dementie: Reablement en dementie, Dementie Ondersteuning en Trainingscentrum De Wever, Tilburg, the Netherlands (2024)	10.00
· *Oral presentation: SPAN+: Eigen kracht bij dementie*	

Conferences	
• International Psychogeriatric Association (IPA) Congress, Santiago de Compostela, Spain (2019)	40.00
· *Poster presentation: Activities in nursing home residents: The association between specific activity components and depression*	
• International Psychogeriatric Association (IPA) Congress (Online) (2021)	18.00
· *Poster presentation: Informal antidepressant strategies in nursing homes*	
· *Oral presentation: Stimuli changes and challenging behavior in nursing homes during the COVID-19 pandemic*	
• SANO Wetenschapsdag, Leiden, the Netherlands (2022)	16.00
· *Poster presentation: Psychometrische evaluatie van vragenlijsten voor het in kaart brengen van stemmingsbevorderende handelingen in verpleeghuizen*	
• Alzheimer Europe Conference, Bucharest, Romania (2022)	32.00
· *Oral presentation: Actions to Improve Mood (AIM) – Psychometric evaluation of inventories for mapping mood-improving behaviors in nursing homes*	
• International Psychogeriatric Association (IPA) Congress, Lisbon, Portugal (2023)	32.00
· *Poster presentation: Agreement between nursing-home caregivers' observations of residents' depression, wellbeing, and quality of life*	
• SANO Wetenschapsdag, Amsterdam, the Netherlands (2023)	16.00
· *Poster presentation: Agreement between nursing-home caregivers' observations of residents' depression, wellbeing, and quality of life*	
• International Psychogeriatric Association (IPA) Congress, Buenos Aires, Argentina (2024)	8.00
· *Poster presentation (presented by Debby Gerritsen): Measuring the unspoken: Development of two instruments to assess nursing home caregivers' implicit associations with behaviors to improve residents' mood*	
Other	
• Peer reviewer (2020 – 2024)	20.00
· *Reviewing scientific articles for Tijdschrift voor Gerontologie en Geriatrie and International Psychogeriatrics*	
• Research/project associate (2020 – 2025)	150.00
· *Contributing to various projects:*	
• *Empowerment for people living with dementia (SPAN+)*	
• *Knowing and measuring in order to improve – Insight into wellbeing (SHINE)*	
• *Informal and formal depression care in nursing homes (InFormeD)*	
• *Dementia and very severe challenging behavior, the next step (D-zep next)*	
• *Sensory information processing in nursing home clients with dementia and very severe challenging behavior (D-zep SI)*	
• Research coach (2021 – 2025)	25.00
· *Providing advisory support within the University Knowledge network for Older adult care Nijmegen (UKON), assisting science practitioners (SPs) of affiliated UKON organizations with research-related questions*	

Teaching activities	
Lecturing	
• Lecturer: Open University, Faculty of Psychology, Department of Theory, Methods and Statistics, Heerlen, the Netherlands (2020 – 2024)	416.00
Supervision of internships / other	
• Supervision of MSc Psychology students (Open University, Heerlen, the Netherlands) and AIOS elderly care physicians (VOSON, Radboudumc, Nijmegen, the Netherlands) (2019 – 2023)	50.00
Total	**1367.00**

A

UKON University Knowledge network Older adult care Nijmegen

Open Universiteit

Radboudumc university medical center