Received: 9 September 2021 | Accepted: 1 March 2022

DOI: 10.1002/gps.5701

REVIEW ARTICLE

International Journal of Geriatric Psychiatry WILEY

Coping strategies for memory problems in everyday life of people with cognitive impairment and older adults: A systematic review

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Funding information
WOA Institution: DEUTSCHES ZENTRUM FUR NEURODEGENERATIVE ERKRANKUNGEN
Open access funding enabled and organized by Projekt DEAL.

Abstract

Objectives: Dealing with memory loss is a major challenge for older people. Coping strategies for memory problems could enable cognitively impaired people to live independently for longer. We conducted a systematic review to summarize evidence on coping strategies for older people and people with cognitive impairment to stabilize everyday life functioning.

Methods: We systematically searched the databases PubMed, PsychInfo, Scopus and WebofScience using a well-defined search string. Studies were included if they were published between January 1990 and February 2021 and written in English, German, Spanish, French, or Swedish language. Two blind researchers independently checked the studies for inclusion and exclusion criteria and evaluated the quality of the studies using Critical Appraisal Skills Programme—checklists. Evidence was summarized in a narrative synthesis.

Results: A total of 16 relevant studies with adequate quality were identified. These studies reported on three categories of strategies: external, internal, and behavioral coping strategies. External strategies included reminder systems and integrated features in the environment and were used by people with and without cognitive impairments. Internal strategies such as visualization, verbalization, active remembering, and systematic thinking were reported less often by people with cognitive impairment than those without cognitive impairment. Behavioral strategies such as reducing expectations and acceptance of support was most frequently reported by people with cognitive impairment.

Conclusions: The findings of our systematic review show a great number of coping strategies, which seem to depend on cognitive status. Appropriate training tools incorporating these strategies should be developed.

KEYWORDS
cognitive impairment, coping strategies, everyday life, older people

Abbreviations: AI, artificial intelligence; CI, older adults with cognitive impairment; MCI, mild cognitive impairment; OA, older adults without cognitive impairment; PICO, population, intervention, control, and outcomes; PRISMA, preferred reporting items for systematic reviews and meta-analysis; SMI, subjective impairment but have no measurable impairment.

Key points

- People with and without cognitive impairment report the use of a comparable number of memory strategies, which include internal, external, and behavioral strategies.
- External memory aids, especially reminder systems like notes, calendars, and lists, are the most commonly reported strategy, irrespective of cognitive status.
- Internal strategies such as visualization, verbalization, active remembering, and systematic thinking are more frequently reported by people without cognitive impairment than by people with impairment.
- Behavioral strategies such as reducing expectations, acceptance of support, allowing a surplus in time, and anticipatory and preventive acts are mostly reported by people with cognitive impairment.

1 | INTRODUCTION

As we age, cognitive functioning is at an increased risk of decline. While some people experience normal cognitive functioning even in old age, most people will experience some degree of cognitive decline, especially in memory function. This decline can be non-pathological. Impairment may be limited to subjective changes but can also affect daily functioning.[1,2] Other people experience pathological changes in cognition, such as mild cognitive impairment (MCI) and, at the far end of the spectrum, dementia. In the latter case, a progressing neurodegeneration leads to progressive and severe memory deterioration.[3] This degeneration results in severely impaired everyday functioning. Difficulties in everyday life, be they due to non-pathological or pathological memory decline, result in an increased use of healthcare services.[4-6] Therefore, enabling independent living for as long as possible is an important goal. To this end, it is crucial to identify how older people cope with cognitive deficits in everyday functioning.

Non-pharmaceutical lifestyle interventions have shown great potential to prevent cognitive decline as well as the onset and progression of dementia. Examples of such interventions are changes to diet and physical activity,[7] social activity,[8] cognitive training[9-12] and cognitive stimulation.[13] In contrast to cognitive training, which uses standardized tasks to aid specific cognitive functions, cognitive stimulation relies on less structured everyday activities to improve cognitive and social functioning. Examples of such activities include bibliography work and quizzes.[14] Multi-domain lifestyle interventions, such as the Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER), hold particular promise.[15] While it cannot be ruled out that reverse causality may be involved, i.e. that those with better cognitive function may engage more successfully with lifestyle modification,[16] findings of improved or stabilized cognition appear robust. However, additional methods are necessary to aid with the management of everyday memory problems.

This paper focuses specifically on such memory problems, meaning subjectively perceived troubles or problems with memory. Initial evidence suggests that there are strategies which can significantly contribute to deal with memory problems in everyday life.[17,18] Helpful strategies can comprise internal and external strategies as well as behavioral coping strategies. While external memory strategies are tools which help compensate for memory impairment (e.g. notes, calendar), internal memory strategies can assist with focusing attention in a particular way and being mindful of certain information (e.g. visual imagery).[19] Behavioral coping strategies, in contrast, include self-regulatory functions to control emotional and physiological responses by adapting expectations, actions and behavior to one's abilities.[20] It is not established to what extent such strategies may be used differentially along the cognitive functioning spectrum, which ranges from people without any impairment, over those who perceive a subjective impairment but have no measurable impairment (SMI) and those with MCI, to those with dementia.

To our knowledge, only one review has previously investigated coping strategies in people with dementia who had no additional confounding neurological disorder. This meta-synthesis review[21] examined coping experiences and strategies of people diagnosed with dementia. Topics addressed were shame, residential care, food, spirituality, employment, social activity, dementia diagnosis and reactions to the diagnoses of others, everyday technology, music, community care services, living alone as well as the needs of people with dementia belonging to a minority group (LGTBQ+, ethnic groups). The findings demonstrate that people with dementia can develop coping strategies that enable them to manage dementia symptoms. These strategies included emotional strategies (e.g. humor, acceptance of memory loss, avoidance of challenging situations) and compensatory and behavioral strategies (e.g. seeking support, adapting and adjusting own expectations to actual skills).[21]

However, in this previous review, no specific focus was placed on coping with activities of daily living. Further, the review included individuals living both inside and outside of institutional care. We consider a focus on daily living outside institutional care an important addition, as an increasing independence of home-dwelling older individuals in their everyday life would crucially reduce their need for nursing and medical care.[22] More profound knowledge about coping strategies may also have clinical implications, especially in the field of cognitive rehabilitation, as these coping strategies can also help to improve functioning in everyday context and can enhance quality of life in the long-term. Providing useful and versatile strategies may

contribute to achieving this. Yet information on this is limited. Further, as the previous review is restricted to adults with a dementia diagnosis, it is not known how the use of strategies may vary across the spectrum of cognitive functioning in old age. This information may crucially affect how strategy interventions are designed. To address these gaps, the present review focused on strategies for everyday memory problems used by older adults with and without cognitive impairment.

2 | METHODS

This systematic review was conducted in adherence with the guidelines specified by the Preferred Reporting Items for Systematic Reviews (PRISMA).[23] Inclusion and exclusion criteria were determined by the PICO (Population, Intervention, Control, and Outcomes) model,[24] see the following section. The review was preregistered in the International Prospective Register of Systematic Reviews (PROSPERO, registration number: CRD42020193737).

2.1 | Population, intervention, control, and outcomes criteria

Population. We aimed to identify all available studies with a focus on non-institutionalized adults aged 60 or older with or without cognitive impairment. This included cognitively unimpaired older adults (OA = older adults without cognitive impairment) with no intellectual disability and older adults with age-related cognitive impairment (CI = older adults with cognitive impairment) that is.: (1) people with subjective memory impairment but have no measurable impairment (SMI; self-reported memory problems that cause worries/help-seeking[25,26]), MCI or dementia. Impairments that are associated with cognitive decline but are not restricted to older adults like schizophrenia, genetic dementia heralds, medication-induced memory problems, stroke, Parkinson's disease, cancer, pneumonia, depression, traumatic brain injury and asthma were excluded. There was no restriction in terms of ethnicity. Articles investigating a sample including individuals under the age of 60 were included if more than two thirds of the participants were aged over 60 years.

Intervention. Articles were included if they report on strategies that either cope with or support everyday life difficulties, or help to enhance everyday life functioning through commonly available objects. We define commonly available objects as objects that are present in a typical home. This restriction was used to ensure that everyone could implement the strategies described in this review in their own home. Innovative technical tools like artificial intelligence (AI)-technology, virtual reality, and robots were excluded. Further, rehabilitation programs were eliminated since the strategies cannot be implemented independently. Preventive measures such as physical exercise and cognitive training were not be considered since their beneficial effects for dealing with memory related everyday life problems are not reliable.[7,8,27-30]

Comparison or intervention. To summarize evidence on strategies for dealing with memory problems, all cross–sectional, cohort, case–control, trials, qualitative, intervention, and case studies were included. Subjective reports on effectiveness of strategies were regarded just as valuable as comparisons to control groups.

Outcome measurements. We include outcomes that reflect maintenance or improvement of everyday functioning or the autonomy in older adults with or without cognitive impairment. Primary outcomes that measure physical and cognitive functioning as well as quality of life were excluded.

2.2 | Search strategy

A literature search was conducted in the electronic databases PubMed, Web of Science, PsycInfo, and Scopus on February 12, 2021. No filter restriction was applied to the results in order to identify as many relevant studies as possible. Search terms were a combination of everyday functioning-related terms, memory coping-behavior-related terms, and population-related terms followed by exclusion-related terms. The exact search terms are displayed in Table 1. This search string was run for title and abstract in PubMed and PsycInfo. As this option is not available in Web of Science, we ran the search by topic. The electronic search was complemented by manual search and the references of the identified eligible review articles.

2.3 | Language

We only considered papers in English, German, Spanish, French and Swedish language.

2.4 | Data extraction

Retrieved references were extracted by one reviewer (SR) and were directly imported to the reference software EndNote X9. Search results from all databases were combined in a single EndNote library for screening. After manually removing all duplicates, the potential relevance of papers was determined by two independent reviewers (SR, LH) in a four stage screening process. Judgments were based on the inclusion and exclusion criteria and disagreements were resolved by consensus and involvement of a third reviewer (FR). In the first stage, a screening by title was conducted. Abstracts of retained articles were screened in stage two. In the third stage, remaining articles were screened on a full-text level. In the final stage, the quality of the remaining studies was evaluated using the *Critical Appraisal Skills Programme* (CASP) checklist for the respective study type (e.g. qualitative study). The CASP checklist requires yes/no judgments on indicators of high quality (e.g. use of appropriate methods). An overall judgment of quality was made based on the percentage of "yes" judgments (see

TABLE 1 Search terms used in databases

Concept	Search terms
Everyday functioning-related terms	"everyday activity deficits" OR "everyday activities" OR "activities of daily living" OR "everyday activity performance" OR "everyday experiences" OR "everyday memory problems" OR "doing everyday life" OR "daily activity performance"
Memory coping-behavior terms	strategy OR strategies OR coping OR compensation OR "compensatory strategy use" OR "memory compensation"
Population-related terms	"older adults" OR elderly OR "old age" OR aging OR ageing OR dementia OR "cognitive impairment" OR "memory problems" OR "memory deficits" OR "cognitive loss" OR alzheime* OR "memory decline"
Exclusion- terms (entered with pre-fix NOT)	exercise OR nutrition OR "physical activity" OR cancer OR stroke OR asthma OR pneunomia OR "artificial intelligence" OR "virtual reality" OR "cognitive training" OR parkinson OR robot OR children OR pedagogic* OR "stem cell" OR immigration

TABLE 2 The Critical Appraisal Skills Programme (CASP) checklist results for assessing the methodological quality of the remained studies after full-text screening

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	CASP total score
Auffray and Azzopardi[31]	+	+	+	+	+	–	–	–	+	+			+
Berg et al.[32]	+	+	+	+	+	–	–	+	+	+			+
Blieszner et al.[33]	+	+	+	+	+	–	–	+	+	+			+
Corin et al.[34]	+	+	+	–	–	–	–	–	+	+			–
Frazer et al.[35]	+	+	+	+	–	–	+	+	+	+			+
Gould et al.[36]	+	+	–	–	–	–	+	–	–	–	–	+	–
Hache et al.[37]	+	+	+	+	–	–	+	–	+	+	+	+	+
Hertzog et al.[38]	+	+	+	+	+	–	–	+	+	+			+
Imhof et al.[39]	+	+	–	+	–	+	+	+	+	+			+
Johansson et al.[40]	+	+	+	+	+	–	+	+	+	+			++
Johansson et al.[41]	+	+	–	+	+	+	+	+	+	+			++
Joosten-Weyn et al.[42]	+	+	+	+	+	–	–	+	+	+			+
Nygard and Ohman[43]	+	+	+	+	+	–	–	+	+	+			+
Nygård and Starkhammar[44]	+	+	+	+	+	–	+	+	+	+			++
Rogers et al.[45]	+	+	+	+	+	–	+	+	+	+			++
Rotenberg et al.[46]	+	+	+	–	+	+	+	+	+	+			++
Stockwell-Smith et al.[47]	+	+	+	+	+	–	+	+	+	+			++
Thoft and Ward[48]	+	+	+	+	+	–	+	+	+	+			++

Abbreviations: Question rating: +, Question can be answered with "yes"; –, Question can be answered with "no"; CASP – Total score: ++, High quality (80%–100% of the questions answered with "yes"); +, Good quality (60%–80% of the questions answered with "yes"); –, Low quality (20%–40% of the questions answered with "yes").

Table 2). We included only studies with a high (80%–100% "yes") or good (60%–80% "yes") quality. This was to ensure the general adequacy and rigor of studies included in the sample. Quality ratings from two independent reviewers (LH and SR) were compared and discussed until consensus was reached. Final ratings were checked by the third reviewer (FR). Per protocol, one reviewer (SR) extracted information from the included studies into a table. Specifically, details on study sample, strategy type and content and strategy application in everyday life were extracted. A second reviewer (LH) checked the table.

2.5 | Screening process

A summary of the decisions made during the screening process is graphically displayed in Figure 1. A total of 9903 records, $n = 1101$ via PubMed, $n = 1493$ via Scopus, $n = 1006$ via PsycInfo and $n = 6303$ via WebofScience, were identified through database search. Additionally, 16 records were identified through manual search. In stage 1, after removing 2319 duplicates, two independent raters (LH, SR) conducted the title-screening. LH identified $n = 750$ studies and SR identified $n = 786$ studies as relevant. The general interrater

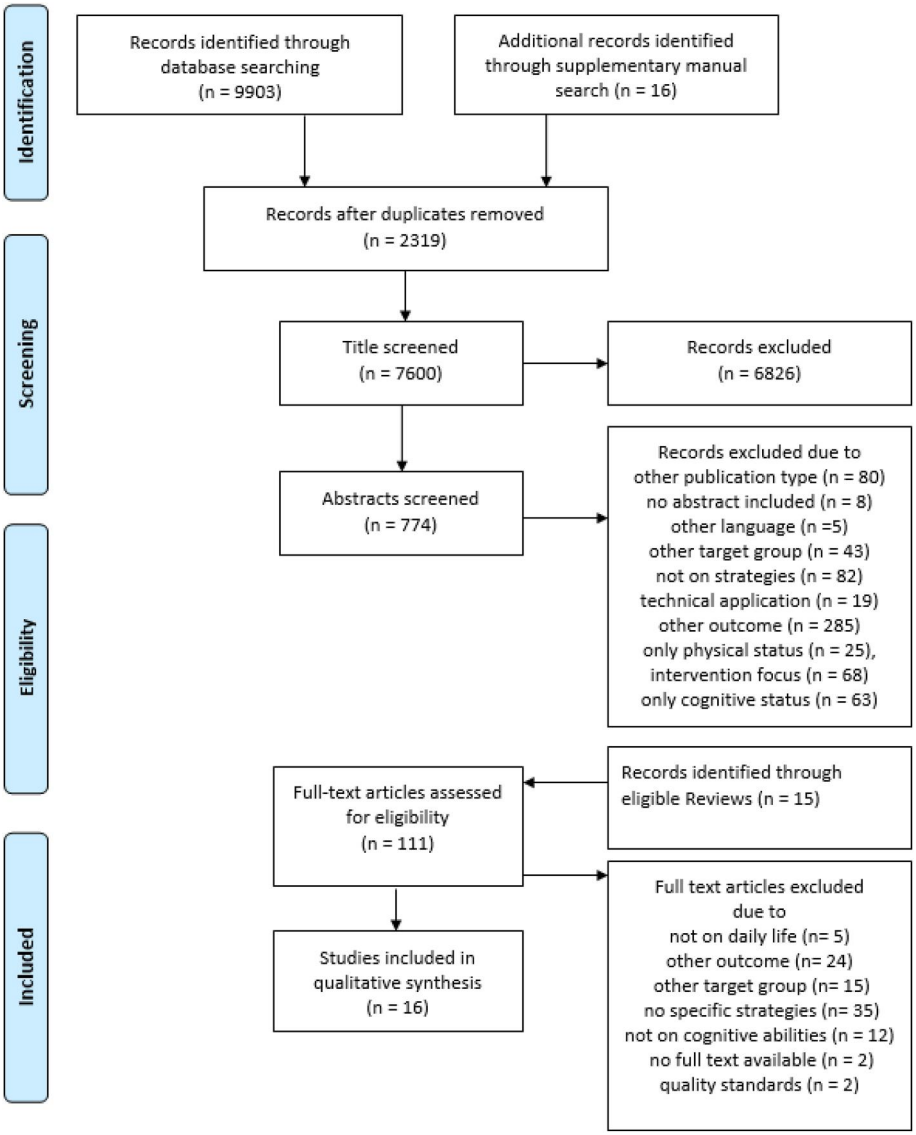

FIGURE 1 Flow diagram of the literature search process (according to prisma-statement.org)

reliability as estimated via Cohen's kappa was 0.958 ($z = 83.54$, $p < 0.001$). All titles chosen by any rater were retained ($n = 774$). A total of $n = 6826$ papers were eliminated that either did not meet the inclusion criteria or were another publication type, such as editorials, books, book chapters, dissertations, conference contributions, commentaries, not peer reviewed papers and papers without an abstract.

In stage 2, the abstracts of the remaining relevant publications ($n = 774$) were screened. LH identified $n = 64$ studies (8.27%) and SR included $n = 121$ studies (15.63%). Based on the abstracts, the two raters agreed in their ratings for $n = 641$ studies (82.82%, Cohen's kappa 0.19, $z = 5.75$, $p < 0.001$). The $n = 133$ studies with disagreements were discussed by the two raters until consensus was reached. In total, $n = 96$ papers met the inclusion and exclusion criteria and were further screened on a full text level in stage 3. Reference lists of eligible reviews were screened and revealed $n = 15$ studies that were also included in the full text screening, resulting in a total of $n = 111$ papers included in the full text screen.

During the full text screening (stage 3), both raters agreed in their ratings for $n = 100$ studies (90.09%, Cohen's kappa 0.6710, $z = 7.07$, $p < 0.001$). There was initial disagreement for $n = 11$ studies. Agreement was reached by discussion. A total of $n = 93$ studies were excluded.

In stage 4, the overall quality of the remaining studies ($n = 18$) was judged using the CASP-checklist. This lead to further exclusion of two studies due to low methodological quality (missing information on method and analysis, inadequate measurements). In total, 16 studies were eligible for our narrative synthesis (Table 2).

2.6 | Data abstraction and synthesis

Characteristics of selected studies including OA and CI are presented in Table 3 and Table 4, respectively. Studies were summarized in a narrative synthesis organized by type of strategy. For each strategy,

we outline the content, the outcome investigated, and the differences between OA and CI.

3 | RESULTS

Altogether, 16 eligible studies comprising 15 qualitative studies[31-33,35,38-46,48,63] and one cross-sectional study[37] were identified including 392 OA (n = 4 studies) and 220 CI (n= 12 studies). The sample size of studies investigating OA ranged from 14 to 294 participants (median sample size = 42) and participants' mean age ranged from 69.9 to 78.4 years (median age = 72.55). The sample size of studies with CI ranged from 7 to 73 participants (median sample = 12.5). Of these, 44 participants reported SMI, that is, they self-reported memory problems which they sought help for.[31,32] Further, 103 participants had a diagnosis of MCI, and 73 participants had a diagnosis of dementia. Mean ages in studies including people with cognitive impairment ranged from 70 to 83.1 years (median age = 74.6). Only one study included a mixed sample of people with MCI and dementia.[41] The identified studies were conducted in Sweden (n = 5), the United States of America (n = 3), France, Canada, Switzerland, Israel, Netherlands, United Kingdom, Australia and Denmark. For further details, see Tables 3 and 4.

3.1 | Types of strategy

Overall, OA (Table 3) and CI (Table 4) report a comparable number (count) of total strategies. In the following, we present the strategies reported in the included studies and categorize these as internal, external, or behavioral coping strategies. Within each section, we start by describing the most commonly reported strategies. Thereafter, we report on any strategies that are used either more commonly by OA than CI, or vice versa, as we observed qualitative differences.

In general, it can be observed that external strategies, specifically external aids, are used across the spectrum of cognitive status. External strategies are the strategy type most often reported by OA, as Table 3 indicates. Hache et al.[37] confirm that healthy older adults report significant less internal than external strategies ($p \leq 0.001$). In comparison, CI use behavioral strategies the most, followed by external strategies. In this group, internal strategies are reported least often, as shown in Table 4.

3.1.1 | External strategies

An important external strategy is the use of external aids. Almost all studies reviewed (except one study investigating people with MCI;[32]) point to reminders as crucial external aids for older adults across the spectrum of cognitive status. These reminders contain information on future activities and appointments as well as descriptions of past and future events.[31,33,35,37-46,48,63] Reminders exist in a variety of forms. They include calendars,[31,33,35,37,38,41,46,48,63] lists,[31,35,37-40,46] notes,[31,33,37-39,41-44,46,48,63] diaries,[31,37,39,43,63] pill organizers,[38] appointment books,[38] and routine organizers.[38] Lists are commonly used to record a specific routine or items (e.g. shopping list). All reminder systems help to record and check events across time to prevent forgetting certain things, appointments, and birthdays.[31,33,35,37-46,48,63] Reminders are typically analoge. Only two studies, one with OA[38] and one with people with mild dementia,[48] report the use of reminder systems on technical devices (e.g. smartphone).

While OA can manage and create content for reminder systems on their own, CI come to need assistance with increasing severity of impairment. The study by Stockwell-Smith et al.[63] finds that CI create reminder content independently for as long as possible. Once they are no longer able, others have to take over. The ability to benefit from reminder system's contents is relatively stable across the progression of impairment. Only at later stages there appears to be difficulty to understand a calendar.[48,63] Johansson et al.[41] point out that, as dementia continues to progress, external aids seemed more helpful to those who were aware of their memory problems. Thoft and Ward[48] remarked that most CI created written reminders for themselves but that they, at times, forgot to read these notes or forgot where they were located.

Another strategy is to integrate external strategies in the environment. As several studies report, visual cues in the environment, such as well-placed external memory aids or items, can be beneficial. Meaningful links can be created between everyday objects like a wallet or keys and a consistently used, dedicated storage place.[46] Reminders located in the environment help when trying to remember things to bring.[37] Linking items to a dedicated storage place reduces the need to "go looking for" misplaced items and enables to act spontaneously.[31,38,45,46] Three out of four studies with OA and one out of two studies with people with subjective memory impairments report a benefit of such visual cues.[31,38,45,46] An additional prominent external strategy is to keep a specific order. Avoiding a cluttered or untidy environment enables to find things more easily. Two studies with OA and one study with people with subjective memory impariments report a benefit from keeping order.[31,37,46]

Further, studies report that routines help with memory and give everyday life a meaningful structure. For OA, only one study reported the use of routines as a strategy for everyday life.[38] In contrast, for CI, habits and routines play a critical role.[32,39-41,43,44,46,63] e.g., Johansson et al.[40] report a detailed routine cooking routine: A person with dementia described moving one ingredient from one side of the stove to the other to avoid double usage.

3.1.2 | Internal strategies

The internal strategy mentioned most often is to actively remember things by consciously concentrating more and repeating things in memory. This is true overall and for both OA and CI, individually. People report that this helps them retain information that they would

TABLE 3 Descriptions of the high-quality studies based on strategy reports from older adults without cognitive impairment (OA)

Author	Sample	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
Auffray and Azzopardi[31]	*N* = 14 participants (mean age 78.4, SD 7.3), France	Cognitively healthy seniors	Senior associations	Investigating encountered daily life difficulties related to prospective memory	Semi-structured and structured interviews, analyzed according to Clément, Preux, Fontanier and Léger[49]	(1) External strategies: (a) Place an object in obvious location (100%) (b) Make lists (93%) (c) Calendar (86%) (d) Diary (57%) (e) Note taking (57%) (f) Write things on hand (57%) (g) Determine a particular order for things to do (57%) (h) Determine order (50%) (2) Internal strategies: (a) Transforming time-based task into event-based task (57%) (b) Repetition (21%) (c) Remember the number of things to do (14%) (d) Concentration (14%) (e) Make knot in handkerchief (7%) (f) Think regularly about things to remember (7%)
Hache et al.[37]	*N* = 294 community-living seniors (mean age 71, SD 7.3), Canada	Excluded if reported diagnosis of a cognitive impairment	Part of larger project on community organizations for older adults	Exploring the choices of memory strategies in common situations of everyday life, their diversity, and to analyze their relevance	Adapted MSQ (5 open-end questions on everyday situations with up to 3 responses per situation), quantitative analysis	(1) External Strategies: (a) Note taking (98%) (b) Use special object/organization in the environment as a reminder (64%) (c) Use specific object/shape/organisation (64%) (d) Diary (59%) (e) Calendar (48%) (f) Use environmental context (16%) (g) Facilitating/familiar accessories (7%) (h) Set an alarm (4%) (i) Use a structured list (3%) (2) Internal strategies: (a) Repeat (56%) (b) Structure the execution (33%)

(Continues)

TABLE 3 (Continued)

Author	Sample	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
						(c) Use characteristic-name associations (19%) (d) Effort/concentration/attention (15%), e) organize information (14%) (f) Face-name associations (13%) (g) Visualization (13%) (h) Make reference to self or others (12%) (i) Plan & verify (11%) (j) Involve hearing (7%) (k) Follow a pattern (6%) (l) Write several times (3%) (m) Use a letter/number as cue (2%) (3) Behavioral strategies: (a) Relying on others (32%) (b) Relating to others (3%)
Hertzog et al.[38]	*N* = 25 community-dwelling participants (mean age 69.9, SD 5.4), USA	Independently living adults over 55	Adult Cognition Lab's participant database	Examining what older people do to support everyday memory functioning	Semi-structured interviews, data analysis using a qualitative coding scheme developed as a combination of bottom-up process and a top-down approach[50]	(1) External strategies: (a) Usage of appointment book or calendar incl. electronic reminders (100%) (b) Stick to habits and routines (100%) (c) Grocery lists (d) Pill organizers (e) Placing items in prominent locations
Rogers et al.[45]	*N* = 59 participants (mean age 74.1, SD 6.5), USA	Healthy, active adults over 65	Organizations (i.e., continuing education program, senior centers, neighborhood club, high-rise retirement community)	Investigating frustrations and difficulties in basic activities of daily living	Focus-group interviews at recruitment organization, categories for coding were developed through several iterations by reviewing the proposed categories	(1) External Strategies: (a) Compensation (e.g memo pads everywhere) (~50%) (2) Internal Strategies: (a) Self-improvement (learning new skills, concentrate more on remembering names) (~< 50%) (3) Behavioral strategies: (a) Adapt task performance due to limitation (~50%) (b) Perseverance (more time for a task, task performance less thoroughly and accurately) (~50%)

Abbreviations: MMSE, Minimal Mental State Examination; MSQ, Memory Situation Questionnaire; N, Number of participants; SD, Standard Deviation.

TABLE 4 Descriptions of the high-quality studies based on strategy reports from older adults with cognitive impairment (CI)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
People with SCI and MCI						
Imhof et al.[39]	*N* = 32 with memory problems (mean age 73.7, SD 5.83), Switzerland	Self-reported memory problems, no diagnosis of dementia	Advertisement, open-house event in memory clinic	Exploring experience and strategies in everyday life of elderly people becoming forgetful	Open-ended interviews, observations during interviews and tours of participants' homes, data analysis based on grounded theory[51]	(1) External strategies: (a) Creating less demanding structures in the environment (b) Spatial ordering by creating a meaningful link between important everyday objects (e.g. wallet, keys) and the storage place (e.g., put the keys in always the same place) (c) Creating & maintaining routines (writing notes varying from hints for future activities, to do lists to a more diary format with descriptions of past and future events) (2) Internal strategies: (a) Avoid time pressure by planning in more time (3) Behavioral strategies: dealing with feelings of shame and embarrassment (normalizing forgetfulness):
Rotenberg et al.[46]	*N* = 12 help-seeking participants (mean age 76.9), Israel	over 65, self-reported memory problems for 6+ months, and MMSE score ≥24	Help-seekers taking part in lager study recruited through geriatric clinics	Investigating how help-seekers make sense of their experience of memory problems	Semi-structured interviews in the homes, data analysis using interpretative phenomenological analysis[52]	(1) External strategies: (a) External memory aids, for example, calendar (75%) (b) Routines (66%) (2) Behavioral strategies: (a) Minimization of memory problems (66%), b) normalization of memory problems (58%) (c) Self-acceptance (58%) (d) Not taking part in conversations, social and leisure activities (58%)

(Continues)

TABLE 4 (Continued)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
						(e) Seeking medical help (41%) (f) Rationalization of task demands as objectively challenging (25%) (g) Let other people overtake certain tasks (25%)
Berg et al.[32]	*N* = 17 with MCI (mean age 72, SD n/a), Sweden	MCI: medical history and Global Deterioration Scale of 2 or 3	Longitudinal Gothenburg MCI-study, recruitment at clinic	Investigating how individuals comprehend and cope with cognitive health problems and everyday life challenges	Semi-structured interviews in the home or at the memory clinic, data analysis using thematic analysis[53]	(1) External strategies: (a) Structure days and weeks (2) Behavioral strategies: (a) Adaptions to limited capacity (avoid stress) (b) Social support, both in the now and in the future (c) Normalize memory problems
Blieszner et al.[33]	*N* = 73 MCI patient with partner (mean age 75.0, SD 6.09), USA	MCI: memory clinic with neurological test batteries and differential diagnosis	Memory clinics	Gaining insights into everyday experiences of couples dealing with MCI	Face-to face interviews with people with MCI and their spouses in their homes, deductive qualitative analysis with an inductive grounded theory approach[54]	(1) External strategies: (a) Use of calendars (b) Note taking (c) Verbal or written reminders (2) Behavioral strategies: (a) Being given specific tasks to complete by spouse (b) Spouses overseeing and adapting routines to be manageable (c) Staying engaged in family affairs, spending time together and avoiding going out separately (d) Acceptance (e) Help from spouse in medication management
Joosten-Weyn et al.[42]	*N* = 8 with MCI (mean age 74.8, SD 8.1), Netherlands	MCI: neuropsychological test battery and multidisciplinary diagnostic assessment accord. to Petersen et al.[55]	Memory Clinic	Investigating MCI patients experience and cope with their cognitive decline	Protocol-based interviews at home or at the clinic, data analysis using the grounded theory approach[56]	(1) External strategies (63%): (a) Taking notes (b) More organization (2) Internal strategies: (a) Repeating things that need to be remembered (b) Visualization (3) Behavioral strategies:

TABLE 4 (Continued)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
						(a) Emotion-oriented coping (63%; acceptance, resignation, normalization of forgetfulness (b) Avoidance-oriented coping (63%; hide memory problems from others, prevent mistakes by avoidance of difficulties situations, deny forgetfulness) (c) Ask for help
People with dementia						
Frazer et al.[35]	*N* = 8 with Alzheimer's Disease and/or mixed dementia (mean age 83.1, SD 7.0), United Kingdom	Dementia: physician diagnosis	Mental health service for older people	Investigating how women with dementia see themselves and cope in their daily lives	Semi-structured interviews, data analysis using an interpretative phenomenological approach[57]	(1) External strategies: (a) To-do lists (b) Calendars (2) Behavioral strategies: (a) Reducing expectations (b) Acceptance of memory decline (c) Positive perspective on life (d) Minimizing the problem
Johansson et al.[40]	*N* = 15 with dementia (mean age 79.3, SD 4.9), Sweden	Dementia: physician diagnosis	Food, Exercise and Memory Loss project, recruitment in primary health care setting after diagnosis	Exploring the management of meal-time tasks by persons with dementia	In the context of home visits, open-ended questions, observations of the setting and the participants' behaviors, data analysis followed an ethnographic approach[58]	(1) External strategies: (a) Rely on old habits and embodied routines (b) Shopping list usage most common to compensate for memory loss (c) Moving ingredients after use to avoid double usage as part of a routine (d) Planning the week's lunches ahead of time (e) Keeping track of the time to know when it is time to eat using reminder systems (2) Behavioral strategies: (a) Assistance in buying/ delivering groceries

(Continues)

TABLE 4 (Continued)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
						(b) Simplify cooking by (partly) relying on pre-prepared foods (c) Avoiding conversation while shopping can aid memory (d) Checking that the stove has been turned off (e) Acceptance
Nygard and Ohman[43]	*N* = 7 with dementia (mean age 71), Sweden	Dementia: DSM IV and NINCDS-ADRDA criteria	Outpatient memory investigation unit	Investigating how persons with dementia manage difficulties in their occupational daily lives	Repeated interviews and observations of daily activities in outpatient unit and home, data analysis upon phenomenological approach[59]	(1) External strategies: (a) Use of visual/tactile/auditory cues (100%) (b) Note taking incl. diaries (100%) (c) Habits and routines (100%) (d) Choose strategic locations for objects (85%) (e) Memory aids excl. diaries (42%) (2) Internal strategies: (a) Verbalize aloud while performing activities (100%) (b) Trying, repeating, starting again (100%) (c) Stopping & reversing an error (85%) (d) Increasing attention & rigor (71%) (e) Doing one thing at a time (71%) (f) Being more cautious (51%) (3) Behavioral strategies: (a) Support from others (100%) (b) Avoidance of unfamiliar places/activities/overly demanding situations (85%) (c) Controlling (e.g. check that the door was locked before leaving) (85%) (d) Careful planning to avoid improvisation (e.g.

TABLE 4 (Continued)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
						pre-packing a purse to be able to leave the house spontaneously) (71%) (e) Allowing a surplus in time (57%) (f) Normalizing memory deficits (57%) (g) Taking chances and letting go of problems that occurred (42%)
Nygård and Stark hammar[44]	*N* = 10 with dementia (mean age 81.7, SD 4.7), Sweden	Dementia: DSM IV criteria	Geriatric clinic	Examining difficulties and response strategies in telephone use among non-institutionalized persons with dementia	Inductive, guided interviews in the home and field notes of actions after each interview, data analysis using the grounded theory approach[50]	(1) External strategies: (a) Using written information (b) Store telephone in one single habitual place (2) Internal strategies: (a) Verbalization by reading aloud to themselves from letters or commenting aloud to themselves while trying to perform tasks (b) Accept problems without efforts to solve it (c) Repetition (d) Stop & reflect before taking the next action step (3) Behavioral strategy: (a) Adapt to circumstances without obvious strategies (trying/taking a chance) (b) Seek help from other people
Stockwell-Smith et al.[47]	*N* = 13 with dementia (mean age 74.6, SD 6.3) and caregiver, Australia	Dementia: over 65, living in the community, Clinical Dementia Rating of 0.5–1 or physician diagnosis	Community presentations, newspaper editorials, advertisements	Exploring the impact of early-stage dementia in managing behavioral and functional changes	Semi-structured interviews in dyads at home, field-notes were compiled post-interview, data analysis using an interpretative descriptive approach[60]	(1) External strategies: (a) Written reminders incl. calendars (100%) (b) Maintain routine (2) Behavioral strategies: (a) Remain engaged with community (most dyads) (b) Resilience (c) Withdraw from community to hide limitations (minor dyads)

(Continues)

TABLE 4 (Continued)

Author	Population group	Sample description	Recruitment	Study aim	Data collection and analysis	Key findings
Thoft and Ward[48]	*N* = 12 with mild dementia (mean age 72.6, SD 4.4), Denmark	Dementia: physician diagnosis of dementia at least 6 m prior, defined as mild by MMSE (10–26) and judgment of participant advocates	Danish school service for older people	Investigating how people with mild dementia experience and manage everyday life	Semi-structured interviews in the context of the school, data analysis using Max Van Manen's five lifeworld essentials, an hermenteutic phenomenology approach[61]	(1) External strategies: (a) Calendar usage independently or through others (b) Note taking (2) Behavioral strategies: (a) Keeping active and positive (b) Taking time (e.g. by emailing instead of calling) (c) Ask others
People with MCI and dementia						
Johansson et al.[41]	*N* = 13 MCI and dementia participants (*n* = 5 MCI, mean age 72, SD 4.8; *n* = 8 mild dementia (7 AD, 1 mixed), mean age 70, SD 7.5) and relatives, Sweden	MCI: accord. to Winbald et al.[62], dementia: DSM IV criteria	Memory clinic	Examining experiences of cognitive impairment in everyday life and the need for support by people with MCI/mild dementia and their relatives	Guided interviews in the memory clinic or home, analyses using the grounded theory methodology[54]	(1) External strategies: (a) Taking notes (b) Calendars (c) Dosage unit for medications (d) Alarm watches (2) Internal strategies: (a) Think systematically to find belongings (b) Go back to starting point (when forgetting what to do next) (c) Repetition (3) Behavioral strategies: (a) Controlling own actions (b) Ask for help as a last resort (c) Acceptance

Abbreviations: AD, Alzheimer's Disease; DSM – IV, Diagnostic and Statistical Manual of Mental Disorders (5th edition); MCI, Mild Cognitive Impairment; NINCDS-ADRDA, National Institute of Neurological and Communicative Diseases and Stroke/Alzheimer's Disease and Related Disorders Assoc; SCI, Subjective impairment but have no measurable impairment; SD, Standard Deviation; USA, United States of America.

have otherwise forgotten. Three out of four studies with CI[31,37,45] and four out of 12 studies with people with MCI and dementia[41-44] report that this strategy was used. People with dementia, in particular, report stopping in the middle of an activity to concentrate in hopes of regaining a memory or gain insight into failed actions.[43,44]

Forming a mental image of something that needs to be remembered (i.e. visualization) is a strategy reported only in one study conducted with OA.[37] Conversely, three studies with people with MCI and dementia stated that participants benefitted from visualization.[41,42,44] One of the least commonly used internal strategies is the use of verbalizations. Reading aloud or commenting while performing a task helps accomplishing everyday tasks, according to one study with people with dementia.[44] Thinking systematically about how to find belongings or going back to the starting point for finding things is another internal strategy used by people with MCI and dementia.[41]

3.1.3 | Behavioral strategies

The most commonly mentioned behavioral change strategy is to reduce own expectations on everyday functioning. This helps overcome frustration while at the same time maintaining the ability to manage everyday life. This also represents one of two behavioral change strategies found in one study with OA.[45] In this study, participants reported allowing themselves more time to accomplish a task or performing a task less thoroughly and accurately. In contrast, nine out of 12 studies with CI indicate that participants accept their everyday memory failures by normalizing them.[32,35,39,40,42-44,46,63] In one study, people with dementia[43] report to adapt to limited capacities by avoiding unfamiliar places, activities, or situations experienced as too demanding as well as increasing attention and doing one thing at a time.

The second most commonly cited behavioral strategy is the acceptance of the support from other people to maintain functioning in everyday life. Only in one study, people without cognitive impairment report relying on others.[37] In contrast, seven out of 12 studies reported that people with subjective memory impairments, MCI, and dementia receive and accept help from other people.[32,40,43,44,46,48,63] One study reported the contrary, finding that people with MCI and dementia see asking a relative for help as a last resort.[41]

Another behavioral strategy is to allow a surplus in time[32,39,43,48] while avoiding improvisation. Improvisation can be prevented by storing utensils in a purse for going outside to be able to leave the house spontaneously while avoiding time pressure which could lead to forgetting.[43] Allowing more time as a strategy was indicated by four out of 14 studies including people with SMI, MCI, and dementia.[32,39,43,48]

Anticipatory and preventive acts are other behavioral memory coping strategies. These acts are designed to prevent problems from occurring in the first place. This can include for example, checking that the stove has been turned off or that the door is closed. Three out of 14 studies report that such preventive measures are reported by people with MCI and dementia.[40,41,43]

Some inconsistencies were found in behavioral strategies for social interaction and openness with memory difficulties. Three out of 14 studies with people with SMI, MCI and dementia report withdrawal from social interactions and community engagement in order to avoid feelings of insecurity and shame due to possible memory impairments.[42,46,63] However, three studies with people with MCI and dementia find a contradicting approach. In these studies, participants report keeping up with appointments and social engagement to remain part of a community despite memory problems.[33,48,63] Also inconsistent is the way participants feel about disclosing memory problems. While in one study, participants reported being open with memory problems in front of family and friends.[32] Yet, participants of another hide memory problems and deny forgetfulness.[42] The latter strategy was reported to be used to avoid feelings of shame.

4 | DISCUSSION

Aim of our systematic review was to systematically summarize evidence on strategies for dealing with everyday memory problems among OA and CI. We restricted this review to strategies that can be implemented in everyday life without professional assistance. We identified 16 studies, which report on helpful external, internal, and behavioral strategies. Participants across the spectrum of cognitive functioning regarded reminder systems like notes, calendars, and lists to be the most useful type of external memory aids. These provide a means of tracking future events and retaining detailed records of past events. Further, external strategies integrated in the environment, such as visual cues and order, facilitate everyday activities. Internal strategies focus on attention and the recollection by active remembering, visualizations, verbalization, and systematic thinking. Compared to external strategies, internal strategies were reported less commonly with decreasing cognitive status. Conversely, behavioral strategies are mostly used by CI. Therein, the most frequently reported strategy was reducing expectations to match the limited capacities and avoid demanding situations.

Accordingly, CI are more likely to change their mindset in relation to a problem, while OA tend to develop active coping strategies in order to maintain everyday functioning. They also rely on internal strategies less often. These inter-individual differences in choice of strategy may be the result of a decrease in available cognitive resources. As cognitive decline progresses, people lose the ability to form new memories[64-66] and information in long-term memory decreases progressively.[65-67] As a result of limited capabilities, they may no longer possess the cognitive resources needed to use internal strategies, which require a certain degree of memory function and reflection to be developed and used. The switch to more external strategies, which do not require long-term memory formation and instead "outsource" memory to the environment, could thus be adaptive.

However, capabilities eventually appear to deteriorate to the point where the individual is no longer able to independently manage their life in a way that supports their everyday function. At this stage, asking other people for help is a strategy employed often by CI.[32,40,43,44,46,48,63] Another strategy that does not tax limited cognitive resources is to refrain from active coping altogether. Instead, some CI reframe forgetfulness and memory problems as normal.[32,35,39,40,42-44,46,63]

The memory strategies delineated in our review may also help to alleviate other functional restrictions. A review by Nygård et al.[68] found that people with acquired brain injury use strategies reviewed here, such as note taking, asking for help, holding on to habits/routines and leaving objects on display, to aid memory, daily functioning, and wayfinding. This emphasizes the importance of progressing research in this area. Ideally, strategies could be taught early in the progression of cognitive decline when learning of new information requires less effort.[69] Hopefully, this would create the basis for more successful intervention in later stages. There may be situations in which early strategy teaching will not be feasible; further research will have to elaborate on this. Some (internal) strategies, used early in the progression of memory complaints, may not be suitable for individuals with more restricted cognitive capacity. Strategies taught will thus have to be tailored to match cognitive capabilities. This will benefit OA and CI in terms of self-esteem and quality of life and will be beneficial in terms of unburdening health care systems.

There are some limitations that must be mentioned. First, this systematic review is restricted to studies that have been published. It was not feasible for us to seek out sources of unpublished work. Second, the review includes only studies published in English, Spanish, French, German and Swedish. It was not feasible for us to evaluate literature in additional languages. Third, most eligible studies are qualitative studies with a small sample size that do not allow for generalization. While qualitative studies are a valuable source of detailed insights into peoples' everyday lives, they also entail a reporter bias which is difficult to account for. Fourth, all included studies that investigated a sample of people with dementia only included people with Alzheimer's disease. Fifth, qualitative differences with regard to the classification of MCI between the studies may exist, as no clear demarcation from SMI or a classification of MCI was stated. Berg et al.[32] includes both people with SMI and MCI, Joosten-Weyn et al.[42] classifies MCI as having "no objective restriction" while Blieszner et al.[33] does not give sufficient information on this. Therefore, a clear classification into people with SMI or MCI was not possible.

5 | CONCLUSION

Our systematic review of strategies for everyday memory problems showed that both OA and CI use a variety of memory strategies. These include internal, external, and behavioral strategies. In the literature, OA report internal strategies more often than CI. This suggests that there may be an association between cognitive resources and the ability to employ internal strategies. Conversely, behavioral strategies are reported almost exclusively by CI. Future studies are necessary to investigate the mechanism of how cognitive status relates to differential strategy use. To improve the ability of older adults to independently live at home, further research may focus on identifying and teaching memory strategies appropriate for the individual.

ACKNOWLEDGMENT

Open access funding enabled and organized by Projekt DEAL.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

ETHICS STATEMENT

Not applicable.

AUTHOR CONTRIBUTIONS

Sabrina D. Ross and Francisca S. Rodriguez contributed equally to the conceptualization and writing of the original draft of the manuscript. Sabrina D. Ross and Lena M. Hofbauer were involved in the screening and editing process. All authors approved the final draft.

CONSENT FOR PUBLICATION

Not applicable.

PREVIOUS PUBLICATIONS

None.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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How to cite this article: Ross SD, Hofbauer LM, Rodriguez FS. Coping strategies for memory problems in everyday life of people with cognitive impairment and older adults: a systematic review. *Int J Geriatr Psychiatry*. 2022;1-18. https://doi.org/10.1002/gps.5701