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Literature Review

Subjective Cognitive Impairment and Affective Symptoms: A Systematic Review

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Abstract

Purpose of Study: Subjective cognitive impairment (SCI) has been argued to reflect affective symptoms (i.e., depression and anxiety) rather than actual cognitive issues. Although a number of studies exist that look at the associations between SCI and affective symptoms, no review is available to aggregate this disparate literature. We addressed this gap by conducting a systematic review to better understand the relationships among SCI and affective symptoms among older adults in both community and clinical settings.

Design and Methods: We reviewed available literature per the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Weight of evidence (WoE) ratings and narrative synthesis were completed for 58 articles.

Results: A majority of studies focused on community-based samples (n = 40). Approximately half (53%) of the articles reviewed met high WoE criteria for the current review. Cross-sectional findings consistently identified a positive relationship among SCI and affective symptoms. Findings from available longitudinal studies (n = 9) were mixed but suggested a possible reciprocal relationship among SCI and depression. The relationship between SCI and anxiety appeared to be driven by fears over loss of function. Following consultation with health professionals, the association between SCI and anxiety was diminished or eliminated.

Implications: Although SCI is consistently related to affective symptoms in older adults cross-sectionally, more longitudinal work is needed to understand their temporal relationship. Improved measurement of SCI would support a deeper understanding of the impact of SCI on psychological well-being.

Keywords: Cognition, Depression, Memory

Subjective cognitive impairment (SCI) refers to the perception of a decline in cognition (typically memory) in the absence of objectively measured cognitive deficits (Jessen et al., 2014). Several related constructs have been used to operationalize SCI, including subjective memory complaints, perceived forgetfulness, or cognitive concerns (Abdulrab & Heun, 2008; Jessen et al., 2014). SCI is common among older adults, with prevalence rates ranging from 15% to 50% across studies (Minett, Da Silva, Ortiz, & Bertolucci, 2008; Reid & Maclullich, 2006); however, it is also decidedly heterogeneous in its clinical presentation as well as long-term cognitive outcomes (Donovan et al., 2014).

SCI is of scientific interest for two main reasons. First, individuals with greater cognitive concerns may be at an increased risk for future objective declines in cognitive performance, including the development of mild cognitive

impairment (MCI) and Alzheimer's disease (AD; Jessen, 2014; Reid & Maclullich, 2006; Reisberg, Shulman, Torossian, Leng, & Zhu, 2010). However, the causal pathway from SCI to objective impairment is unclear. It may be that subtle changes in cognitive function are perceived by the individual before they can be detected through clinical assessment (Jessen et al., 2014) or other factors may contribute to the perception of cognitive problems, such as affective symptoms (i.e., depressive and anxiety symptoms; Buckley et al., 2013; Yates, Clare, & Woods, 2015). Second, greater SCI may negatively affect the mental health of older adults (Parikh, Troyer, Maione, & Murphy, 2015). The perception of cognitive problems can precipitate worry about AD (Kessler, Bowen, Baer, Froelich, & Wahl, 2012; Mol, Ruiter, Verhey, Dijkstra, & Jolles, 2008), withdrawal from positive health behaviors, such as physical and social activity engagement (Burke & Shafto, 2004; Potter, Hartman, & Ward, 2009; Trouton, Stewart, & Prince, 2006), and increase affective symptoms (Crane, Bogner, Brown, & Gallo, 2007; Pietrzak et al., 2012).

Positive mental health is an important contributor to cognitive health throughout the aging process. Affective symptoms among older adults are associated with cognitive decline over time (Sachs-Ericsson, Joiner, Plant, & Blazer, 2005), MCI risk (Belleville, Fouquet, Duchesne, Collins, & Hudon, 2014; Lopez et al., 2003), as well as vascular dementia and AD development (Diniz, Butters, Albert, Dew, & Reynolds, 2013). However, arguments can be made that depressive and anxiety symptoms exacerbate SCI and, vice versa, that SCI contributes to the development of affective symptomatology.

Considering the potential for SCI to indicate a preclinical MCI/AD stage in some individuals (Jessen et al., 2014), characterizing the co-occurrence and temporality of affective symptoms among individuals with SCI is critically important in order to identify those at risk for objective cognitive decline and intervene appropriately. This systematic review begins to address this need by comprehensively examining the current evidence base regarding the relationships among SCI and affective symptoms, critiquing this evidence according to study quality and relevance to this review, and synthesizing evidence across studies to better explicate potential relationships between SCI, depressive symptoms, anxiety symptoms, and overall mental health in older adults.

Design and Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009) criteria were used to guide and implement this systematic review and narrative synthesis.

Search Strategy and Selection Criteria

A detailed and systematic literature search was conducted in March 2015 using the PubMed, PsycINFO, and CINAHL databases. Reference lists of identified articles were also examined for additional relevant papers. Search terms were initially identified by the authors, and this list was updated as the search progressed and additional terms were identified. The following search terms were ultimately individually entered into each database: *cognitive complaints*, *cognitive concerns*, *cognitive difficulties*, *cognitive failures*, *memory concerns*, *memory difficulties*, *memory failures*, *perceived forgetfulness*, *self-reported cognitive impairment*, *self-reported memory problems*, *subjective cognitive decline*, *subjective cognitive dysfunction*, *subjective cognitive impairment*, *subjective memory concerns*, and *subjective memory impairment*. Search terms did not include depression, anxiety, or affective symptom descriptors and no date limits were placed in order to capture all articles that were potentially relevant to the goal of this review. Inclusion criteria were as follows: sample or subsample of adults over the age of 50 years with a mean age greater than 55 years; measure of SCI and at least one affective symptom; and publication available in English. Samples could include MCI or AD subgroups for comparison but had to also include a group with SCI only (no objectively measured cognitive deficits). Community-based and clinical samples as well as self and informant SCI report measures were included. Books or book chapters, editorials, literature reviews, and dissertations or theses were excluded.

Five members of the review team conducted independent title, abstract, and full-text reviews in order to determine eligibility. When any doubt or disagreement existed regarding the inclusion of an article, the team discussed the article at an in-person meeting. The information extracted for each study included study purpose, design, operational definition of SCI, instruments, results, and general conclusions relevant to the review aim.

Critical Appraisal

A critical appraisal of the quality and relevance of each included article was conducted using the weight of evidence (WoE) framework (Gough, 2007; Weed, 2005). WoE is a framework that allows researchers to customize the quality and relevance appraisal criteria for a systematic review based upon their specific research question(s) rather than using a generic appraisal that provides evaluative criteria not specific to any particular review. Therefore, WoE criteria will be different for each individual systematic review. In this review, the WoE framework was customized to be used in the evaluation of *Methodological Quality* (WoE A), *Methodological Relevance* (WoE B), and *Topic Relevance* (WoE C). For each of the three categories, a rating of low, medium, or high was assigned in accordance with criteria set forth by the WoE framework (Table 1). Each article was independently evaluated by one of five authors. A subset of 10% of the articles were selected at random for cross-checking by another reviewer based on similar systematic review protocols (e.g., Armstrong, Lauder, & Shepherd,

Table 1. Weight of Evidence Framework Applied for Critical Appraisal

	High	Medium	Low
WoE A: Methodological Quality • *Not review-specific.* • Generic evaluation of study quality. • Judgment of coherence and integrity of evidence in study.	Explicit and detailed Methods and Results section for data collection and analysis. Well-designed and described. Clear interpretation of findings.	Satisfactory Methods and Results sections. Enough details to determine what was done. Some design and/or interpretation issues.	Poorly designed or described. Poorly controlled or inadequate power.
WoE B: Methodological Relevance • *Review specific.* • Judgment about appropriateness of study design/method to answer the *review question.*	Aims of study include using SCI to predict affective symptoms or vice versa.	Aims of study include using SCI to predict outcomes but not affective symptoms. Incidental findings related to review.	Aims of the study or analyses are not relevant to the review.
WoE C: Topic Relevance • *Review specific.* • Judgment about the relevance of the study focus to answer the *review question.*	Adequate measures used for SCI and affective symptoms.	Measurement of SCI *OR* affective symptoms poor.	Measurement of SCI *AND* affective symptoms poor.

Notes: SCI = subjective cognitive impairment; WoE = weight of evidence.

2015); interrater agreement was 94.4% (agreement on 17/18 WoE ratings). Discrepancies were resolved through discussion among the reviewers to achieve consensus.

Results

Studies Included in the Review

The PRISMA flow diagram (Figure 1) depicts the search strategy and selection process for this explicit systematic review. The initial search resulted in a total of 6,681 articles for review. After duplicates and articles not meeting selection criteria based on an initial review were removed, a total of 689 records were screened, and 228 full-text articles were reviewed. If a study was considered to be irrelevant to the current review, it was classified as having low relevance and thus excluded; therefore, only high and medium WoE B ratings are included in this review. Figure 1 identifies the rationale for article exclusion. A total of 58 articles were included (Table 2).

Forty-seven studies were cross-sectional and 11 longitudinal, although 2 of the longitudinal studies only had cross-sectional results relevant to this review (thus they were grouped with cross-sectional studies in our narrative synthesis). Sample sizes ranged from 23 participants (Study 15) to over 15,000 participants (Study 53). Study settings varied; 42 incorporated participants recruited from nearby communities and 16 comprised clinical samples recruited from memory clinics, primary care providers, hospitals, or outpatient clinics. There was also a large international representation of studies; only 11 studies were conducted in the United States.

Affective symptoms were assessed in all 58 of the studies reviewed, including depressive symptoms (n = 52), anxiety symptoms (n = 20), and general mental health (such as life stress, tendency to experience negative affect, and general mental health assessments nonspecific to depression or anxiety; n = 4). As a measure of affective symptoms, 31% (n = 18) of the studies used the Geriatric Depression Scale, 12% (n = 7) used the Center for Epidemiological Studies-Depression scale, 10% (n = 6) used the Beck Depression Inventory, 9% (n = 5) used the State-Trait Anxiety Inventory, and additional measures were used less frequently (e.g., Hamilton Depression Rating Scale). Fourteen of the studies (24%) used a 1-item measure of SCI and the remaining studies used checklist or multi-item measures that included between 2 (Grambaite et al., 2013) and 87 (Caselli et al., 2014) items to assess SCI. There were no consistent trends demonstrated in the strength of the relationships between SCI and affective symptoms based on the number of items in the SCI measures. All 58 of the studies incorporated self-report assessments of SCI and 2 of these also incorporated informant reports of SCI. Due to the low number of informant-reported SCI measures, we collapsed across the two types of reports for this review.

Methodological Quality of Reviewed Studies

Of the 58 studies evaluated, more than half (n = 31) were rated as being of high *methodological quality* (WoE A), 24 studies were classified in the medium spectrum, and only 3 were considered to be of low methodological quality because of ambiguous or unclear methodological descriptions or poor study design (Table 1). Regarding *methodological relevance* (WoE B), all 58 reviewed studies met the criteria for high (n = 21) or medium (n = 37) methodological relevance (WoE B). Studies classified as being of medium relevance often failed to achieve the highest ratings because the associations between SCI and affective symptoms were

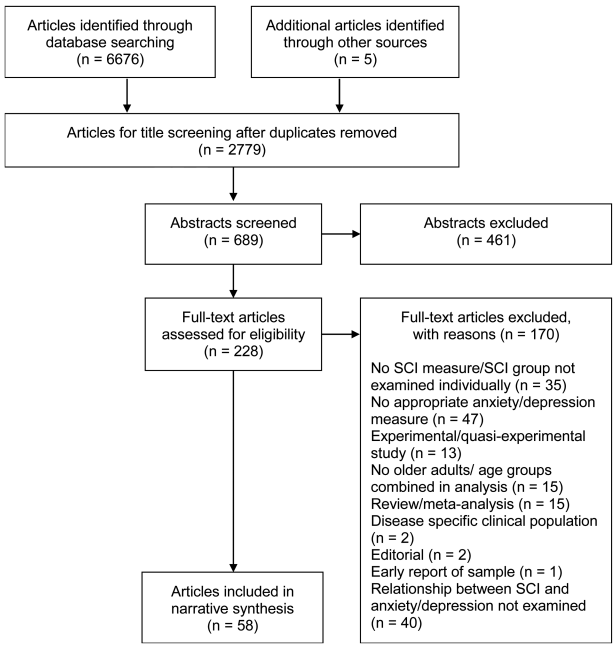

Figure 1. Study selection flow diagram.

not the central focus of the study but included affective measures (of relevance to the current review) as a covariate. Lastly, over 50% of the studies (n = 31) were rated as high *topic relevance* (WoE C), as both measures of SCI and affective symptoms were deemed appropriate. Twenty-five of the studies were rated as medium topic relevance due to the weak measurement of either SCI or affective symptoms. Two studies were rated as low topic relevance because both measures of SCI and affective symptoms were deemed to be weak. Most commonly in this case, constructs were measured through one or few items from invalidated measures.

Results of Reviewed Studies

The following synthesis of study findings is categorized by sample characteristics as well as study design. Cross-sectional and longitudinal studies are reviewed separately, and these are further divided based on the presence or absence of comparative groups of cognitively impaired participants (i.e., formally assessed cognitive impairment, MCI, or AD). It is important to note that individuals with MCI also have SCI (self- or informant-reported) as part of MCI's diagnostic criteria (Albert et al., 2011). However, self-awareness of cognitive impairment is highly variable in AD, including in its early stages (Leicht, Berwig, & Gertz, 2010; Orfei et al., 2010); therefore, individuals with AD in the included studies did not necessarily have SCI or had varying levels of SCI depending on study instrumentation. For the purposes of this review, inclusion of MCI or AD groups was used as an additional point of comparison with SCI groups (individuals with no objectively measured cognitive impairment). All studies are identified by their corresponding numbers in Table 2.

Cross-Sectional Findings Without Cognitively Impaired Groups

In cross-sectional studies, SCI was consistently associated with greater depressive symptoms, more anxiety, and poorer mental health among older adults without clinically assessed cognitive impairment (Studies 1, 2, 5–7, 10–13, 15–18, 20–24, 26–33, 35–39, 43), including comparisons between groups with and without SCI (Studies 4, 8, 14, 25, 34, 40, 42) and degree of SCI symptoms (e.g., self-ratings of minor or major memory disturbances; Studies 3, 9, 41; Table 2, Section 1). Although the nature of cross-sectional study designs cannot support conclusions regarding temporality of symptoms, several studies examined more nuanced aspects of SCI or affective symptoms that help to further our understanding of their co-occurrence. For example, Jessen and colleagues (2007) identified three groups of participants: no report of memory problems, general report of memory problems but little to no impairment in specific memory tasks (e.g., recalling a name of someone they met), and general report of memory problems along with self-reported frequent impairment in memory tasks. Participants in the third group, who self-identified as having SCI as well as frequent problems in specific areas such as recalling recent conversations, had significantly higher depression scores than both of the other groups. Langlois and Belleville (2014) found that depression scores were positively associated with memory problems *with consequence*, such as forgetting to take a medication or forgetting an appointment, but not with other aspects of SCI that were measured (e.g., remembering personal events).

Verhaeghen, Geraerts, and Marcoen (2000) examined the relationship between SCI and anxiety specifically *about developing dementia*. They found that higher perceptions of memory problems may lead to increased memory-related anxiety, which may further lead to an increase in perceived seriousness of memory problems. The level of concern related to memory problems influenced participants' coping, suggesting self-appraisal of SCI concerns may be an important determinant of their influence on an individual. It was this interplay of complaints, appraisal of complaints, and coping with complaints that influenced anxiety, as the authors state: "…our analysis suggests that memory complaints in older age may not be innocuous, transient, and inconsequential as they sometimes seem to the practitioner. Rather, they might be quite central to mental health in older age and may well cause dysphoric symptoms and lack of zest in life" (p. 545). Indeed, one study found that when asked to rank a list of health-related symptoms in terms of their perceived level of importance, individuals who ranked SCI symptoms as highly important also had higher levels of depressive symptoms (Study 3).

Cross-Sectional Findings Including Cognitively Impaired Groups

Several cross-sectional studies (n = 5) compared affective symptoms between SCI and cognitively impaired groups (MCI or AD), with decidedly mixed results (Table 2,

Table 2. Summary of Articles Included in Review

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Section 1. Cross-sectional findings without cognitively impaired groups (Articles 1–43)								
Balash et al. (2013) #1	Cross-sectional	Community-based (Israel) 68 (9.8) years *n* = 636	Do you have a sustained memory problem which has progressed over the last year?	GDS (Short Form); STAI	SCI positively correlated with depression and anxiety, independent from cognitive status.	H	M	M
Bazargan & Barbre (1994) #2	Cross-sectional	Community-based (United States) 73.4 (*SD* NR) years *n* = 1,242	Indicated whether poor memory and forgetfulness was: a very serious problem, a somewhat serious problem, or hardly a problem	CES-D; Stressful Life Events scale	Depression and number of stressful life events were significantly related to SCI. Relationship between SCI and stressful life events remained significant when depression held constant.	M	M	M
Begum et al. (2012) #3	Cross-sectional	Primary care patients (United Kingdom) 74.6 (6.9) years *n* = 126	GMS (8 items)	GDS (Short Form)	"Significant" SCI associated with case-level depression. Higher SCI symptom rank (ranked among a list of health-related symptoms and/or disorders) associated with increased depressive symptoms.	H	M	M
Brucki & Nitrini (2009) #4	Cross-sectional	Community-based (Brazil) 62.3 (9.16) years *n* = 163	Do you have memory problems?	Patient Questionnaire of the PRIME-MD	SCI associated with high mental symptoms (combined measure of somatic, depressive, and anxiety symptoms).	M	M	M
Cargin et al. (2008) #5	Longitudinal (2.5 years) *Only cross-sectional included*	Community-based (Australia) 69.0 (8.0) years *n* = 100	CFQ (35 items)	STAI; CES-D; GHQ	SCI positively correlated with anxiety, depression, and general mental health at baseline.	H	M	H
Castro-Lionard et al. (2011) #6	Longitudinal *Only cross-sectional included*	Community-based (France) 72.9 (1.2) years *n* = 686	Numeric scale to indicate changes in memory over the last 5 years; CDS (26 items)	GAS	SCI positively correlated with anxiety at baseline.	M	M	H
Chin et al. (2014) #7	Cross-sectional	Memory clinic patients (Korea) 63.3 (7.3) years *n* = 108	MMQ-A (57 items)	GDS (Short Form)	SCI negatively correlated with depression; Note: indicates a correlation between higher SCI and higher depression due to coding of the depression measure.	H	H	H

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Clarnette et al. (2001) #8	Cross-sectional	Memory clinic patients (Australia) Cases: 62.6 (*SD* NR) years Controls: 62.2 (*SD* NR) years Cases: *n* = 97 Controls: *n* = 38	Subject complaint of memory difficulties	CAMDEX	SCI group was more likely than the non-SCI group to report depression and anxiety symptoms.	M	H	L
Derouesné et. al. (1989) #9	Cross-sectional	Community-based (France) 62.9 (8.2) years *n* = 367	Subject memory disturbances rated as absent, minor, major; SMS (8 items)	SDS	Individuals with higher SCI ratings had higher depression and anxiety scores than those with minor SCI ratings.	L	H	H
Derouesné et al. (1999) #10	Cross-sectional	Memory clinic patients (France) 61.1 (7.6) years *n* = 183	Subject memory disturbances rated as absent, minor, major; SMS (8 items)	SDS	Participants with only minor SCI had lower depression and anxiety scores compared with those with major SCI. SCI positively correlated with depression and anxiety.	M	H	H
Dufouil et al. (2005) #11	Cross-sectional	Community-based (France) 68.9 (3.0) years *n* = 733	CDS (39 items)	CES-D	Those with higher SCI scores were more likely to have higher levels of depressive symptoms.	M	M	H
Fischer et al. (2008) #12	Cross-sectional	Hospital outpatients (Canada) 64.3 (13.0) years *n* = 36	PAOF (36 items)	GDS; clinical interview	Depressed individuals had higher scores on total SCI and all subscales of the SCI measure.	M	H	H
Gagnon et al. (1994) #13	Cross-sectional	Community-based (France) 74.8 (6.9) years *n* = 2,726	Subjects indicated whether they had problems in memorizing new simple information	CES-D	Depression indicated greater odds of reporting participants had problems with memorizing new information.	M	H	M
Genziani et al. (2013) #14	Cross-sectional	Community-based (France) 74.3 (*SD* NR) *n* = 9,294	Subjects indicated whether they had habitual forgetfulness and/or difficulty remembering new information	CES-D	Participants with SCI were significantly more likely to meet the cutoff score for depression.	H	M	M
Grambaite et al. (2013) #15	Cross-sectional	Memory clinic patients (Norway) 58.8 (7.2) years *n* = 23	SCL-90 (2 items)	SCL-90; GDS	Higher depression associated with higher SCI.	M	H	M
Harwood et al. (1999) #16	Cross-sectional	Community-based (United States) 75.2 (7.5) years *n* = 506	MQ (12 items)	HAM-D	An increased risk for depression was associated with a higher SCI score.	M	M	H

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Hohman et al. (2011) #17	Cross-sectional	Community-based (United States) 75.4 (7.8) years *n* = 105	CFQ (25 items)	CES-D	Higher depression indicated higher SCI.	H	H	H
Hollands et al. (2015) #18	Cross-sectional	Community-based (Australia) 70.9 (6.6) years *n* = 289	MAC-Q (6 items)	HADS	Higher depression and higher anxiety were related to higher SCI.	H	H	H
Jessen et al. (2007) #19	Cross-sectional	Primary care patients (Germany) 80.1 (3.5) years *n* = 2,389	Do you feel like your memory is becoming worse?; SMDS (5 items)	GDS	Participants reporting SCI and frequent impairment for individual tasks had higher depression scores than both those with no memory problems and those with SCI but mostly no impairment for individual tasks.	H	M	H
Jungwirth et al. (2004) #20	Cross-sectional	Community-based (Austria) 75 years (all participants) *n* = 302	Investigator-designed 5-item assessment	HAM-D; GDS (Short Form); STAI	SCI was significantly correlated with severity of depression and anxiety.	H	M	M
Laganà & Sosa (2004) #21	Cross-sectional	Community-based (United States) Median = 71 years (mean, *SD* NR) *n* = 216	CFQ (25 items)	SELFCARE-D	SCI was positively related to greater levels of depression symptoms.	M	H	H
Laganà et al. (2011) #22	Cross-sectional	Community-based (United States) 70.2 (*SD* NR) years *n* = 78	CFQ (25 items)	SELFCARE-D	SCI and depressive symptomatology were significantly correlated.	M	M	H
Langlois & Belleville (2014) #23	Cross-sectional	Community-based (Canada) 67.6 (8.9) years *n* = 115	QAM (3 items)	GDS (Short Form)	Higher depression scores were correlated with higher levels of SCI related to memory failures with consequence. No significant correlations were found between depression and other SCI components measured.	H	M	M
Minett et al. (2005) #24	Cross-sectional	Memory clinic patients and community-based (Brazil) 72.6 (4.7) years *n* = 60	MAC-Q (6 items)	GDS; clinical interview	Depression scores were the strongest predictor of SCI. SCI and depression scores were significantly correlated.	M	M	H
Minett et al. (2008) #25	Cross-sectional	Community-based (Brazil) SCI: 67.1 (*SD* NR) years Non-SCI: 65.9 (*SD* NR) years *n* = 114	Do you currently have any problems with your memory? Are these problems interfering with your normal life? (2 items)	GDS	Depression scores were significantly higher in those with SCI than those without SCI.	M	M	H

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Mol et al. (2008) #26	Cross-sectional	Community-based (Netherlands) 72.0 (7.5) years *n* = 300	Do you consider yourself to be forgetful?	SCL-90; MIA	SCI was positively correlated with depression and memory-related anxiety.	H	M	M
Montejo et al. (2014) #27	Cross-sectional	Community-based (Spain) 71.5 (5.0) years *n* = 269	MFE (28 items); CAMDEX (3 items)	GDS	Predictors of SCI in decreasing order of effect size: subjective health perception, depression, and objective daily memory performance.	H	H	H
Moraitou & Efklides (2009) #28	Cross-sectional	Community-based (Greece) 70.3 (5.1) years *n* = 244	CFQ (25 items); BIMQ (9 items)	PANAS	In the older adult group, SCI was positively correlated with negative affect.	M	M	M
O'Boyle et al. (1990) #29	Cross-sectional	Geropsychiatric patients (United States) 68.5 (5.8) years *n* = 33	Ratings of cognitive difficulties in three categories (24 items)	BDI	SCI was positively correlated with depression scores.	L	M	M
Rami et al. (2014) #30	Cross-sectional	Community-based and memory clinic (Spain) 56.8 (10.4) to 74.5 (8.8) years (total mean, *SD* NR) *n* = 794	SCD-Q (24 items)	GDS; HADS	SCI was positively correlated with depression and anxiety.	H	H	H
Rouch et al. (2008) #31	Cross-sectional	Community-based (France) 62 to 68 years (mean, *SD* NR) *n* = 937	CDS (Short Form; 26 items)	QD2A; GAS	Greater depression and anxiety scores were positively associated with higher SCI.	H	M	H
Scogin & Rohling (1989) #32	Cross-sectional	Community-based (United States) 60 to 88 years (mean, *SD* NR) *n* = 55	CFQ (25 items); MFQ (51 items)	SCL-90	Self-rated mental health was significantly associated with self-rated SCI. Informant-rated SCI did not share this association but was associated with cognitive performance.	M	M	H
Slavin et al. (2010) #33	Cross-sectional	Community-based (Australia) 78.6 (4.8) years *n* = 827	MAC-Q (24 items); IQCODE (19 items)	GDS; GAS	SCI was positively correlated with depression and anxiety scores. Groups with high depression or high anxiety scores reported a higher level of SCI when compared with groups with low depression or low anxiety scores.	H	M	H
Smart et al. (2014) #34	Cross-sectional	Community-based (Canada) Controls: 69.6 (3.7) years SCI: 69.5 (2.4) years *n* = 40	Are you concerned or worried that you are experiencing significant decline in your thinking abilities, more than just normal aging?	GDS; AMAS	SCI group had higher depression and anxiety scores when compared with the control group. Despite these differences, neither depression nor anxiety scores reached clinical significance.	H	M	M

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Snitz et al. (2015) #35	Cross-sectional	Community-based (United States) 81.2 (8.4) years *n* = 92	MFQ (64 items); CFQ (25 items); SCCS (24 items)	GDS	Depressive symptoms were positively correlated with almost all aspects of SCI measured.	H	M	H
Stewart et al. 2001 #36	Cross-sectional	Community-based (United Kingdom) 55 to 70 (mean, *SD* NR) years *n* = 290	GMS (# items NR)	GDS (Short Form)	Depression was particularly strongly associated with SCI.	H	M	H
Studer et al. (2014) #37	Cross-sectional	Memory clinic patients (Switzerland) Controls: 66.2 (7.2) years MCI: 70.5 (8.7) years *n* = 139	QPC (10 items)	HADS	Depressive affect was positively related to SCI.	H	M	H
Umegaki et al. (2013) #38	Cross-sectional	Community-based (Japan) 75.1 (6.2) years *n* = 3,814	Investigator-designed 3-item assessment	Investigator-designed 5-item assessment	Depression was associated with SCI overall and specifically with self-reported ability to use the telephone.	M	M	L
Verhaeghen et al. (2000) #39	Cross-sectional	Community-based (Netherlands) 70.1 (7.7) years *n* = 179	MIA (59 items)	Anxiety about dementia, 5-point scale	Greater SCI associated with greater anxiety about dementia.	M	H	M
Wolf et al. (2005) #40	Cross-sectional	Community-based (United States) 61.8 (*SD* NR) years *n* = 42	Global Deterioration Scale (structured clinical assessment); MAC-Q (6 items)	HAM-D	Presence of SCI was associated with higher depression scores.	M	M	H
Zeintl et al. (2006) #41	Cross-sectional	Community-based (Switzerland) 73.0 (4.4) years *n* = 364	PRMQ (8 items)	GDS (Short Form)	Prospective memory high complainers had higher depression scores than low complainers. Participants who reported more prospective memory failures also tended to report more depressive symptoms and a poorer memory capacity.	M	M	H
Zhang et al. (2012) #42	Cross-sectional	Memory clinic patients (China) 70.0 (9.0) to 75.0 (6.0) (total mean, *SD* NR) years *n* = 157	Subject complaint of memory difficulties for 6 months or more	NPI	Clinically significant depression was more common in the SCI than in the normal control group. In the SCI group, depression was one of the most common neuropsychiatric symptoms. The frequency of depression was higher in the SCI group than in the control group.	H	M	M
Zlatar et al. (2014) #43	Cross-sectional	Community-based (United States) 77.3 (12.2) years *n* = 1,000	CFQ (25 items)	PHQ-9	Higher SCI scores were associated with lower mental health composite scores.	H	M	H

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Section 2. Cross-sectional findings with cognitively impaired groups (Articles 44–49)								
Almkvist & Tallberg (2009) #44	Cross-sectional	Memory clinic patients (Sweden) 60.5 (6.3) years *n* = 112	Subject and informant report of cognitive impairment	CDI	SCI group had higher depression scores than MCI or AD groups.	H	M	M
Gallassi et al. (2008) #45	Cross-sectional	Primary care patients (Spain) 67.4 (10.4) years *n* = 92	MAC-Q (# items NR)	STAI; BDI	No significant difference in depression and anxiety scores between SCI and MCI groups.	M	H	H
Kim et al. (2003) #46	Cross-sectional	Community-based (South Korea) 72.6 (6.0) years *n* = 1,204	GMS (10 items)	GMS	Participants with SCI without cognitive impairment were less likely to have depression associated with SCI when compared with those with mild to severe cognitive impairment.	H	M	M
Lehrner et al. (2014) #47	Cross-sectional	Memory clinic patients (Austria) 66.4 (9.2) years *n* = 581	FAI (16 items)	BDI	Participants with SCI, nonamnestic MCI, and amnestic MCI had significantly more depressive symptomatology than a cognitively healthy control group; however, there were no significant differences in depressive symptomatology among those with SCI, nonamnestic MCI, and amnestic MCI.	H	H	H
Lehrner et al. (2015) #48	Cross-sectional	Memory clinic patients (Austria) Median = 67 years (mean, *SD* NR) *n* = 967	FAI (16 items)	BDI	The control group had significantly less depressive symptoms when compared with those with SCI, nonamnestic MCI, amnestic MCI, AD, and PD.	H	M	H
Sinforiani et al. (2007) #49	Cross-sectional	Memory clinic patients (Italy) 71.6 (3.0) years *n* = 75	Subject complaint of memory disturbances in absence of impairment of everyday activities	BDI; STAI	Compared with patients with MCI, patients with SCI presented with significantly higher depression and anxiety scores.	M	H	M
Section 3. Longitudinal findings without cognitively impaired groups (Articles 50–55)								
Heun & Hein (2005) #50	Longitudinal (2–10 years)	Community-based (Germany) 61.0 (16.0) years *n* = 1,431	Clinical interview	Clinical interview	SCI predicted greater risk of developing depression 4 years later.	M	H	M

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Mol et al. (2009) #51	Longitudinal (9 years)	Community-based (Netherlands) 65.8 (7.4) years *n* = 412	Do you consider yourself to be forgetful?	SCL-90	SCI was positively associated with depression and anxiety at baseline. Difference in anxiety between SCI and non-SCI groups at baseline increased by 0.1 point per year.	H	H	M
Potvin et al. (2013) #52	Longitudinal (10 years)	Community-based (France) 65+ years (mean, *SD* NR) *n* = 4,649	Cognitive complaints related to six categories (6 items)	CES-D	SCI was associated with incident depressive symptomatology but not with longitudinal recurrent depressive symptomatology. SCI was associated with a 10-year risk of incident depressive symptomatology above and beyond the effects of trait anxiety.	M	H	M
Singh-Manoux et al. (2014) #53	Longitudinal (10 years)	Community-based (France) 57.9 (3.5) years *n* = 15,510	Presence of memory complaint; investigatory-designed checklist of six cognitive symptoms (8 items)	CES-D	The prevalence of depression in those with SCI was approximately double that in those without SCI. All aspects of SCI measured were associated with depression.	H	H	M
Tobiansky et al. (1995) #54	Longitudinal (2 years)	Community-based (United Kingdom) 74.6 (6.6) years *n* = 524	Short-CARE (9 items)	Short-CARE	At both time points there was a positive association between SCI and depression. Participants with SCI were more likely to be suffering from depression than those without SCI. When followed over a 2-year period, participants with SCI were found to be at twofold greater risk of developing depression compared with those without SCI.	H	H	M
Zimprich et al. (2003) #55	Longitudinal (4 years)	Community-based (Switzerland) 62.9 (0.9) years *n* = 427	NSL (6 items)	SDS	Cross-sectionally, poorer memory predicted higher depression and higher depression in turn predicted higher SCI (objective memory was not related to SCI except through depression). Longitudinally, greater change in depression was related to greater change in SCI over time (some greater increases in depression, greater increases in SCI, and vice versa).	H	M	H

Table 2. *Continued*

Reference	Study design	Sample Mean age (*SD*) *n*	SCI measures (# items)	Affective symptom measures	General conclusions	WoE A	WoE B	WoE C
Section 4. Longitudinal findings with cognitively impaired groups (Articles 56–58)								
Caselli et al. (2014) #56	Longitudinal (3 years)	Community-based (United States) 59.0 (7.4) years *n* = 447	MANS (87 items)	BDI; GDS; HAM-D	Both self- and informant-reported SCI positively correlated with depression, anxiety, and stress. Among those who developed MCI, self-reported SCI preceded informant-rated SCI on average.	H	M	H
Elfgren et al. (2010) #57	Longitudinal (3 years)	Memory clinic patients (Sweden) 59.6 (8.2) years *n* = 59	Subject complaint of memory difficulties	MADRS	Patients with SCI had higher anxiety compared with those with MCI. Prevalence of anxiety symptoms in the SCI group decreased over 3-year follow-up.	L	M	M
Vestberg et al. (2010) #58	Longitudinal (1 year)	Memory clinic patients (Sweden) 57.5 (7.5) years *n* = 58	Clinical interview	HADS	At baseline, no differences were found between the SCI and cognitively impaired groups regarding self-reported cognitive deficits, self-reported worry about deficits, or symptoms of anxiety or depression. A considerable portion of those with SCI scored above the cutoff score for both anxiety and depression at baseline as well as at follow-up. In the SCI group, there were no significant changes regarding symptoms of anxiety and depression from baseline to follow-up.	H	M	M

Notes: AD = Alzheimer's disease; AMAS = Adult Manifest Anxiety Scale; BDI = Beck Depression Inventory; BIMQ = Blank in the Mind Questionnaire; CAMDEX = Cambridge University Structured Clinical Interview (3 items); CDI = Cornell Depression Index; CDS = Cognitive Difficulties Scale; CES-D = Center for Epidemiological Studies-Depression scale; CFQ = Cognitive Failures Questionnaire; FAI = Forgetfulness Assessment Inventory; GAS = Goldberg's Anxiety Scale; GDS = Geriatric Depression Scale; GHQ = General Health Questionnaire; GMS = Geriatric Mental State schedule; HADS = Hospital Anxiety and Depression Scale; HAM-D = Hamilton Depression Rating Scale; IQCODE = modified short Informant Questionnaire on Cognitive Decline in the Elderly; MAC-Q = Memory Assessment Clinics Questionnaire; MADRS = Montgomery-Asberg Depression Scale; MANS = Multidimensional Assessment of Neurodegenerative Symptoms questionnaire; MCI = mild cognitive impairment; MFE = Memory Failures of Everyday questionnaire; MFQ = Memory Functioning Questionnaire; MIA = Metamemory in Adulthood; MMQ-A = Modified Multifactorial Memory Questionnaire; MQ = Memory Questionnaire; NPI = Neuropsychiatric Inventory; NR = not reported; NSL = Nuremberg Self-Assessment List (6 items); PANAS = Positive and Negative Affect Schedule; PAOF = Personal Assessment of Own Function; PD = Parkinson's disease; PHQ-9 = 9-item Patient Health Questionnaire; PRIME-MD = Patient Questionnaire of the Primary Care Evaluation of Mental Disorders; PRMQ = Prospective and Retrospective Memory Questionnaire; QAM = Questionnaire d'auto-évaluation de la mémoiree; QD2A = Questionnaire d'autoévaluation de la symptomatologie depressive; QPC = Cognitive Complaint Questionnaire; SCCS = 24-item Subjective Cognitive Complaints Scale; SCD-Q = Subjective Cognitive Decline Questionnaire; SCI = subjective cognitive impairment; SCL-90 = Symptom Checklist-90-R; *SD* = standard deviation; SDS = 20-item Self-Rating Depression Scale; short-CARE = subjective memory impairment scale from the shortened version of the Comprehensive Assessment and Referral Evaluation; SMDS = Subjective Memory Decline Scale (4 items); SMS = Subjective Memory Scale; STAI = Spielberger State-Trait Anxiety Inventory; WoE = weight of evidence.

Section 2). Findings ranged from no differences in depression and anxiety scores between SCI and MCI groups (Studies 45, 47), higher depression and anxiety scores in SCI groups compared with MCI or AD groups (Studies 44, 49), and lower likelihood of depression in those with SCI compared with individuals with mild to severe cognitive impairment (Study 46). One distinction that can be made among these studies is differences in the approach to measuring SCI. Two studies that found higher affective symptom scores in SCI groups compared with MCI/AD groups (Studies 44, 49) used a largely unspecified categorization of SCI such as subject report of cognitive impairment, compared with established multi-item assessments in the other studies. Study samples also represented multiple populations including memory clinic patients, primary care patients, and a community-based sample, differences that affected the characterization of MCI and AD groups. One study with the highest WoE ratings in all categories (Study 47) found that depressive symptomatology was the same among SCI and MCI groups, but higher compared with a non-SCI group, which is consistent with the findings previously reviewed.

Longitudinal Findings Without Cognitively Impaired Groups

Nine of the reviewed studies (Studies 50–58) included longitudinal assessments relevant to the goal of this review, the majority of which ($n = 6$) did not include comparisons between SCI and cognitively impaired groups (Table 2, Section 3). In most cases, the presence of SCI at baseline was associated with depressive symptoms over time, including a greater risk of developing depression when measured at 2-year (Study 54), 4-year (Study 50), and 10-year (Studies 52, 53) follow-up periods. For instance, the results reported by Singh-Manoux and colleagues (2014), a study with high WoE ratings in all categories, included a dose–response relationship between a higher degree of SCI (in this case, number of cognitive complaints) and an increased risk of depression over a 10-year period. Another study followed SCI and non-SCI groups for 9 years, and although the SCI group had higher depression scores at baseline, there was no increase in these differences between groups over time (Study 51). However, SCI was positively associated with anxiety at baseline, as well as an increase in anxiety symptoms over time in the SCI compared with non-SCI group.

Longitudinal Findings Including Cognitively Impaired Groups

Three studies (Studies 56–58) examined differences between affective symptoms in SCI and cognitively impaired groups over time (Table 2, Section 4). In one study conducted over a 1-year period, there were no differences in depressive or anxiety symptoms at baseline between SCI and cognitively impaired groups, and no change in symptoms in the SCI group at follow-up (Study 58). However, about half of participants reported less worry about their perceived deficits after 1 year. This decline in worry was attributed to a memory clinic visit that occurred subsequent to the baseline assessments; this visit likely put participants at ease regarding their dementia status. One study compared an SCI group with an MCI group over a 3-year period (Study 57). Higher baseline anxiety and psychosocial stress scores were found in the SCI group, but the prevalence of these symptoms decreased substantially over time. As in the previous study, reassurance provided by health care providers at the memory clinic may have played a role in these findings. Caselli and colleagues (2014) examined self and informant reports of SCI and their association with conversion to MCI (Study 56). Both self- and informant-reported SCI were associated with depressive and anxiety symptoms.

Implications

Affective symptoms such as depressive or anxiety symptoms may commonly co-occur with SCI, but how these develop within individuals is likely complex. Although older adults with affective symptoms experience SCI more commonly than those without SCI, prevalence estimates for depression and anxiety in community-dwelling elders range from 1% to 5% and 3% to 14%, respectively (Fiske, Wetherell, & Gatz, 2009; Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010), compared with the much more common experience of SCI (Reid & Maclullich, 2006). When SCI is perceived to have a negative impact on important aspects of daily life, the influence on the development or exacerbation of depressive symptoms may be greater. Similarly, anxiety appears to be closely tied to the potential loss of function related to impaired cognition. SCI was associated with memory- or dementia-related anxiety in this review, so there is a need to distinguish between generalized anxiety and anxiety specific to the potential meaning of perceived cognitive change (namely, future development of dementia). Our review found that when concerns are allayed through medical intervention, anxiety and SCI are less closely related.

Temporality of SCI and Affective Symptoms

Evidence from longitudinal studies indicates an increased risk of depression among individuals with SCI, but additional work is needed to understand the temporal relationships among these variables. Impaired concentration, motivation, and energy associated with depressive symptoms may influence cognitive performance and consequently contribute to a person's perception of their cognitive status (Cargin, Collie, Masters, & Maruff, 2008). Alternatively, perceiving a decline in memory may have detrimental effects on psychological and emotional well-being among older adults, for whom fears of declining autonomy are common (Quine & Morrell, 2007). We found that there

is insufficient evidence to conclude that older adults with SCI have more depressive symptoms than those with objectively assessed cognitive impairment, such as MCI or AD. This is an important finding because cognitive complaints in the absence of objective cognitive decline are often attributed to depression in clinical settings (Bortolato, Carvalho, & McIntyre, 2014). Overall, current evidence consistently supports associations between SCI and depressive symptoms as well as SCI and anxiety symptoms across studies, but little is known regarding the timing of these relationships.

Gaining a better understanding of the dynamic interplay between SCI and affective symptoms over time will undoubtedly help inform inventions and clinical recommendations. For instance, if SCI consistently precedes the clinical expression of anxiety and depressive symptoms, then interventions designed to improve cognitive competencies or reduce fears associated with cognitive aging may help to promote mental health and wellness of an aging population. Conversely, if anxiety and depressive symptoms tend to precede cognitive complaints, treatment efforts focused on reducing affective disorders may be more appropriate; not addressing these underlying issues may limit the effectiveness of any treatment programs intended to help promote cognition in later adulthood. Another possibility is that SCI and affective symptomology may be a result of common risk factors or underlying neurodegenerative processes and clinically manifest at the same time, thus intervention would involve simultaneously addressing both modifiable targets for improving the outcomes of cognitive health. Unfortunately, few studies have examined the temporality of SCI and affect; thus, we were unable to explore which approach to clinical intervention would result in the most effective outcome in the present study. However, because our findings suggest that cognitive concerns could be partially alleviated through medical intervention, a low-cost, potentially impactful solution would be to increase communication between clinical providers and older individuals regarding cognitive health. In this respect, individuals would be more informed of normative age-related decline and, perhaps, have less worry and fear regarding their cognitive capabilities. The limited work in clinical settings offers important future directions for the implementation and evaluation of cognitive interventions.

SCI Measurement

An important consideration in the current evidence regarding SCI and affective symptoms is the lack of consistency in SCI assessment, making it difficult to compare findings across studies (Abdulrab & Heun, 2008; Jessen et al., 2014). SCI measures in this review ranged from single-item yes/no responses, to investigator-developed instruments, to established batteries of self-reported cognitive complaints. Frequently, SCI measures require recall of cognition over long periods of time (e.g., years); however, this too varies across assessments. Retrospective accounts over lengthy intervals lead to bias in responses as individuals will rely on generalizations about cognition rather than specific instances of recent performance (Cavanaugh, Feldman, & Hertzog, 1998). For example, individuals may focus on the experiences related to cognition that were emotionally intense (e.g., forgetting a medication that led to medical complications) but occurred months or years earlier. Alternatively, an individual who has not noticed cognitive issues may use age-based stereotypes or peer group comparisons to classify their current functioning rather than their own experiences (e.g., "Older people lose their memory and I am getting older, therefore my memory must be declining" or "My memory is worse than Joe's and he's older than I am"). Finally, the role of self-efficacy related to cognition and beliefs about cognition (i.e., metacognition) in responding to questions is unclear. The extent to which each of these sources of information influences answering questions about cognition is problematic as it likely varies across individuals and will depend on other factors including affective symptoms. Development of comprehensive measures that lessen the impact of such biases is needed.

Available assessments represent a mix of capacity and concern measurements that could explain the strong and consistent associations with affective symptoms. More dynamic and focused tools for the measurement of SCI would allow researchers to better understand the implications of self-rated cognitive problems for older adults. It is critical for future SCI research to employ instrumentation well suited to the research questions at hand. The Subjective Cognitive Decline Initiative (SCD-I) Working Group proposed a framework for future research examining symptomatic indicators of preclinical AD (Jessen et al., 2014). In this framework, core features of subjective cognitive *decline*, specifically, are proposed including: self-experienced persistent decline in cognitive capacity in comparison with a previously normal status and unrelated to an acute event; normal age-, gender-, and education-adjusted performance on standardized cognitive tests; and the absence of MCI, AD, or a psychiatric, neurologic, or medical condition that could be attributed to the symptoms. The SCD framework explicitly states, "Individual symptoms of depression or anxiety, which do not reach the threshold of a disorder, are *not* considered exclusion criteria" (p. 847).

Moreover, SCI assessments were completed by participants, and less commonly informants, across studies. Both self- and informant-reported SCI positively correlated with depressive and anxiety symptoms, but among those who developed MCI, self-reported SCI preceded informant-rated SCI on average (Caselli et al., 2014). Self-rated mental health was significantly associated with self-rated SCI; informant-rated SCI did not share this association but was associated with objectively assessed cognitive performance (Scogin & Rohling, 1989). Therefore, it is important for future research to consider the meaning of self- versus informant-reported SCI as it relates to a potential preclinical

AD indicator versus a component of affective symptomatology. It has been shown that there is variability in awareness of cognitive impairment among individuals at similar AD stages (i.e., mild to moderate impairment; Leicht et al., 2010; Orfei et al., 2010; Ownsworth, Clare, & Morris, 2006). Among individuals with MCI, self-reports of cognitive problems may relate more to affective symptoms, whereas informant reports may more reliably indicate objective cognitive decline (Edmonds et al., 2014). In all likelihood, differences in awareness are represented among those with SCI as well, if in fact subtle cognitive change is present.

Affective Symptom Measurement and SCI

Relatedly, an additional consideration is that self-reported measures of affective symptoms were predominately used in the studies included in our review (e.g., the Geriatric Depression Scale). Although these measures generally have satisfactory psychometric properties and are widely used screening tools for symptoms of depression and anxiety in community-dwelling older adults (e.g., Nyunt, Fones, Niti, & Ng, 2009), they are not without limitations. Self-reported measures may not capture atypical dimensions or less common manifestations of depression and anxiety (Uher et al., 2012); the item content of one established measure may weigh the intensity and frequency of affective symptoms differently than another; demographic, cognitive, and personality variables may contribute to the underreporting or overreporting of affective symptom severity (Carter, Frampton, Mulder, Luty, & Joyce, 2010); certain symptoms may be more suitable for clinical observation (Cuijpers, Li, Hofmann, & Andersson, 2010; Uher et al., 2008); and affective symptoms may express themselves differently in an older population. Furthermore, affective symptoms may manifest as memory or cognitive problems. For example, the Geriatric Depression Scale includes a memory-related item ("Do you feel you have more problems with memory than most people?"). As evidence from our review indicates (Verhaeghen, Geraerts, & Marcoen, 2000), individuals can also have anxiety related to perceived memory problems. The potential for overlap between the measurement of affective symptoms and SCI, then, can lead to measurement difficulties and, consequently, measurement limitations. Multimodal assessment, specifically the simultaneous use of self-reported measures and clinician ratings or observation (Enns, Larsen, & Cox, 2000; Uher et al., 2012), may therefore produce a more comprehensive assessment of affective symptoms that, in turn, could lead to a more precise examination of relationships with SCI.

Limitations and Future Research

An important limitation of the current review is that the final sample of articles included studies with community-based samples as well as those from clinical settings. Inclusion of samples from places such as memory clinics may have increased the likelihood of finding a consistent association among SCI and affective symptoms. Individuals who were experiencing significant concerns over their cognition (enough to seek professional assistance) likely have higher affective symptoms related to other areas as well. However, these articles made up only a small portion of those reviewed and conclusions would remain the same if these studies were excluded. Future work should investigate whether the strength of the association depends on the recruitment source as this could be another opportunity for understanding the interplay among cognitive concerns, capacity impairments, and affective symptoms. A second limitation is the lack of longitudinal work on the temporal relationships making it impossible to disentangle the development of SCI and affective disturbances using the current literature. The temporal relationship of SCI and affective symptoms likely varies across individuals with some developing SCI first and reacting with changes in affect (e.g., increased worry about cognition), whereas others develop affective symptoms first that in turn affect perceptions of cognition and performance on daily tasks. Future research should incorporate longitudinal follow-up of participants to account for these temporal relationships and identify which trajectories of development place individuals at greater risk for negative outcomes (e.g., diagnosis of MCI).

The findings of this review are also important to consider within current perspectives of preclinical dementia, including the placement of SCI as the first step on the trajectory leading to MCI and subsequently AD (Jessen et al., 2014). The National Institute on Aging and the Alzheimer's Association (NIA-AA) workgroup proposed definitions of preclinical AD stages based on neuropsychological and biomarker evidence to be used in research (Sperling et al., 2011). However, the NIA-AA report also highlights limitations in the current science, including the lack of an established link between specific biomarkers and the subsequent emergence of clinical symptoms, as well as the need for longitudinal research capitalizing on the promise of examining subjective cognition and its relationship to AD risk. Affective symptoms, particularly depressive symptoms, are known risk factors for AD (Chen et al., 2014). Our review suggests that the interplay of SCI and affective symptoms in the preclinical stage of AD is complex, not well understood, and may be a critical component in understanding the symptomatology of preclinical AD. Further research untangling the complexities of these relationships would further our understanding of the trajectory of AD development and opportunities for targeted interventions.

Conclusion

Investigations of the correlates of SCI constitute a critical area of research that is growing rapidly. Individuals may be able to alert health care providers to early changes in their cognition that, although undetectable using objective measures, do

impair or significantly alter functioning. Understanding how these reported impairments may stem from other underlying conditions, including those that lead to broader impairments in addition to cognition (e.g., depression or anxiety), will aid in the development of person-centered protocols and interventions. Furthermore, identification of subtle but troubling changes in cognition would enable earlier intervention delivery and uptake for individuals who might otherwise continue to experience cognitive decline. This review demonstrates that affective symptoms are important to consider when examining associations between SCI and other constructs, but further work is necessary to disentangle the complexities of these relationships.

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