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Tackling Vision-Related Disability in Old Age: An Application of the Life-Span Theory of Control to Narrative Data

Kathrin Boerner,[1,2] Mark Brennan,[3] Amy Horowitz,[1,2] and Joann P. Reinhardt[1,2]

[1]Jewish Home Lifecare, Research Institute on Aging, New York, New York.
[2]Brookdale Department of Geriatrics and Adult Development, Mount Sinai School of Medicine, New York, New York.
[3]AIDS Community Research Initiative of America, New York, New York.

This study used the life-span theory of control (Heckhausen, J., & Schulz, R.) to examine adaptation to disability in old age. A narrative approach to data collection was used to assess the strategies employed by 364 older adults with macular degeneration to deal with daily challenges. Findings revealed a rich array of strategies. Compensatory Primary Control was reported by nearly all respondents, Compensatory Secondary Control by a majority, and Selective Primary Control by half of the participants. Selective Secondary Control was the least reported. Differences in strategy use depending on level of vision impairment were the most pronounced within the category of Compensatory Primary Control for strategies that involved using help from others and alternative means. Within the category of Selective Secondary Control, effort to maintain a positive outlook was associated with higher impairment levels, whereas within the category of Compensatory Secondary Control, attempts not to dwell on problems related to vision were associated with lower impairment levels. Implications for conceptual development and future research are discussed.

Key Words: Disability—Functional impairment—Life-span theory of control—Narrative data—Old age—Vision loss.

OLD age comes with enhanced likelihood for physical impairments that can limit a person's daily life pursuits and quality of life. Age-related macular degeneration (AMD), a chronic, progressive eye disorder, constitutes a prototypical case of late-life impairment. AMD is the leading cause of legal blindness in the Western world among people aged more than 60 years (World Health Organization, 2004), and it affects 25–30 million people worldwide in some form (AMD Alliance International, 2002). With the aging of the U.S. population, the number of people with visual disabilities due to age-related eye diseases such as macular degeneration is expected to increase markedly over the next 25 years (Massof, 2002).

Research studies have consistently shown that age-related vision loss is linked to high risk for functional disability (e.g., Burmedi, Becker, Heyl, Wahl, & Himmelsbach, 2003a, for a review), poorer mental health outcomes such as depression or anxiety (e.g., Burmedi, Becker, Heyl, Wahl, Himmelsbach, 2003b), and changes in social relationships (e.g., Reinhardt, Boerner, & Benn, 2003). Overall, the available evidence points to the significant impact of age-related vision loss in functional, social, and psychological life domains among older adults. However, much of the prior work has lacked a suitable theoretical framework. In particular, there has never been a systematic comprehensive assessment of the concrete cognitive and behavioral efforts older adults with vision impairment use to cope with the specific daily challenges that result from their impairment. The present study fills this gap.

As a conceptual framework, we use the life-span theory of control (Heckhausen & Schulz, 1995). The theory's focus on control striving makes it a particularly useful framework for the study of age-related conditions that progressively threaten the ability to maintain independence and control in daily life. This is especially the case for individuals with AMD, which causes a loss of central vision needed for many of the most basic day-to-day tasks. For example, reading and recognizing faces becomes increasingly difficult as vision worsens over time, and at some point becomes impossible (e.g., Horowitz, 2004; Rovner & Casten, 2002). Tasks such as paying bills, taking medication, or doing shopping can turn into great obstacles. Mobility also becomes an immense challenge, especially in terms of AMD's impact on driving, as well as being able to read directional signs when using alternative transportation or walking. Thus, to maintain a sense of competence and control in daily life, individuals with AMD are challenged to find ways of handling their day-to-day tasks that account and compensate for their limitations. The present study builds upon previous work on AMD among older adults (e.g., Wahl, Becker, Burmedi, & Schilling, 2004) by examining the use of control-related behavior, as defined in the life-span theory of control, with a unique and highly fine-grained narrative, yet conceptually guided, approach.

The life-span theory of control

Control-related behavior is classified as primary or secondary as well as selective or compensatory (Heckhausen & Schulz, 1995). The aim of primary control strategies is to actively change the external environment, whereas the aim of secondary control strategies is adaptation of internal processes (e.g., goals or interpretations). Selective control strategies target the focused investment of internal resources in a chosen goal either in terms of behavioral resources such as effort or time (Selective Primary Control) or motivational resources such as goal commitment (Selective Secondary Control). Compensatory strategies serve to respond to a dearth of resources to attain a given goal either in terms of bolstering behavioral resources by external means (Compensatory Primary Control) or by disengaging from the unattainable goal through self-protective strategies (Compensatory Secondary Control).

All control strategies are ultimately directed toward maximizing primary control, which is argued to be rooted in evolution, providing individuals with selective advantages regarding survival and reproduction. When confronted with a blocked goal, a person may respond with strategies from either of the four categories. However, a key prediction of the theory is that depending on the feasibility of the goal, certain types of strategies are more likely to be used and to be beneficial than others. For example, the first three types of strategies (Selective Primary Control, Selective Secondary Control, and Compensatory Primary Control) are assumed to be activated when goal pursuit is challenged and to be most adaptive when striving for a particular goal is still feasible. Goal disengagement and the long-term protection of a person's motivational resources, in contrast, are addressed by Compensatory Secondary Control strategies and become increasingly important when people experience permanent loss and limitations.

Moreover, selective efforts involve a focusing of existing inner resources onto a particular goal, whereas the use of compensatory strategies generally involves the recognition, on some level, that one's goal pursuits require a different approach, something more than just "trying harder," by pulling in external resources or reconsidering one's ways of doing or thinking about things. For example, when a person experiences increasing difficulty reading due to progressive vision loss, he or she may at first respond by just straining the eyes and taking more time to read (i.e., investing effort and time; Selective Primary Control), as well as by avoiding any distractions (which in that moment involves deprioritizing other goals; Selective Secondary Control). However, with worsening vision, the person may have to consider other options, such as using adaptive aids or asking other people to do the reading (Compensatory Primary Control). In particular, when vision loss reaches a point of causing significant functional impairment, the person may also respond with self-protective strategies that involve a rethinking of the role of reading (e.g., thinking that being able to listen to music may be even more or at least as important; Compensatory Secondary Control).

To assess control-related behavior as defined in the theory, Heckhausen and colleagues designed an instrument, the Optimization in Primary and Secondary Control (OPS) scale (Heckhausen, Schulz, & Wrosch, 1999). Wahl and colleagues have conducted empirical work based on this scale regarding adaptation to visual impairment (e.g., Wahl et al., 2004). Findings show that individuals with vision impairment do endorse general items on usage of control strategies from all four categories, and there was an increase in endorsement of compensatory secondary control over time along with an increase in disability (Wahl, Schilling, & Becker, 2007). The latter finding is in line with the theoretical prediction that higher use of self-protective strategies is likely to emerge with more severe disability.

Rationale for a theory-guided narrative approach to studying adaptation to disability

Although the work by Wahl and colleagues has demonstrated the usefulness of the life-span theory of control and its constructs, we argue that a theory-guided narrative approach can augment this prior research (see Boerner & Jopp, 2007, for a review): First, the general OPS scale does not include specific items on use of technical aids, which is a cornerstone of coping with disability. Second, the key tenets of the life-span theory of control center around the concepts of goal engagement (Selective Primary, Selective Secondary, and Compensatory Primary Control) and disengagement or self-protection (Compensatory Secondary Control), and the idea that the usage and adaptiveness of these strategies depends on the feasibility of the goal. A person with a chronic disability may struggle with a number of individual goal pursuits due to the functional losses and limitations caused by the disability. On the most general level, the goal that is blocked is daily functioning. However, because individuals do not disengage from the global concept of functioning in daily life unless completely physically and mentally dependent, we are most likely to see meaningful differences in the pattern of goal engagement and disengagement in specific areas of everyday functioning (e.g., cooking, reading, traveling, etc.). Different areas of life are likely to be more or less challenging at different points. We are more likely to capture actual daily use of control strategies, reflecting more of a goal engagement or disengagement or more of selective or compensatory orientation, when we ask about strategy use with respect to the person's personal goals or challenges. It has been argued that personal goal or challenge assessments are best done in an open-ended style to capture specificity, concreteness, and ecological validity of individuals' goals (e.g., Emmons, 1992; Heckhausen, 1997). With such a narrative approach, responses on strategy use are thus anchored in the concrete life

situations that each individual faces. Furthermore, in addition to strategies exemplifying conceptual constructs, unexpected strategies may be reported, which could inform subsequent structured assessments and theory development. Therefore, this study seeks to extend prior work on adaptation to age-related disability by using a narrative approach to assess control strategies reported in response to specific challenges faced by older adults who experience vision loss due to AMD.

Control strategies in response to vision loss–related challenges: study predictions

On the most general level, we expected that the narratives provided by participants would reflect all four categories of control strategies. We also expected that within the four categories, the reported strategies could further be specified according to the subcategories formulated by the authors of the theory. However, given the inductive nature of qualitative analysis, we remained open for the possibility that some narrative material might require us to formulate new subcategories to adequately represent participants' accounts of strategy use in response to self-reported daily challenges.

Among the four general control categories, we predicted that Compensatory Primary Control strategies targeted to the mastery of instrumental challenges of daily life would be particularly prominent.

Moreover, although all strategies are needed to optimize primary control, we predicted both compensatory strategies would be more prominent with more severe impairment, as they involve the use of either external or alternative means to compensate for restrictions in internal resources and self-protective cognitive strategies that are meant to ameliorate the emotional toll of struggling with a disability. Within the category of Compensatory Primary Control, we expected more use of help from others and of alternative means and less use of aids with higher impairment levels (e.g., when reading with a magnifier becomes too challenging, a person is more likely to ask others to do the reading). Finally, for selective strategies, we expected they would appear equally prominent across levels of impairment because investing internal resources such as effort and engaging in motivational bolstering of one's goal pursuits will always be needed to function in daily life with a disability.

Methods

Overview of Study Design

Participants were recruited from the pool of applicants at Lighthouse International, a vision rehabilitation agency in the Greater New York City area. They were recruited for a longitudinal study of vision loss among older adults, which involved participation in three yearly in-person interviews and two interim telephone interviews (Months 6 and 18). The qualitative assessment of vision-specific control strategies constituted a major focus of the study. These strategies were generated in response, and linked, to specific self-reported challenges. The remainder of the interview included a wide array of standardized vision, disability, coping, and mental health assessments. The present paper focuses on the baseline sample and on the qualitative component of this study. The baseline interview was conducted in participants' homes and lasted approximately 2 hr.

Sampling Procedures

Eligibility criteria included age 65 years or older; diagnosis of age-related macular degeneration, but best corrected acuity 20/60 or worse; first time applicant for vision rehabilitation services; and having received only low vision clinical services (i.e., eye examination only, with or without prescription of optical aids, no additional rehabilitation services prior to the baseline interview). Potential participants meeting inclusion criteria were identified using the case record database. During an initial telephone contact, potential participants were further screened for English-speaking, community residence, onset of functional problems due to vision loss within past 2 years, and sufficiently cognitively able and hearing intact to participate in face-to-face and telephone interviews. The response rate was 50%. A comparison of participants with refusals indicated that those who did not agree to participate were slightly older ($t\,[708] = -2.27$, $p < .05$) but that the two groups did not differ with respect to gender or best-corrected visual acuity.

Sample Description

Sample characteristics are displayed in Table 1. The study sample ($N = 364$) included older adults with an average age of 83 years. Nearly two thirds of the sample were women; almost all were white, and the majority reported having adequate income and having completed at least a high school education. Two fifths of participants were married. Visual acuity levels spread out fairly evenly, with a similar percentage of participants having scores of 20/60 to 20/100 (43%) versus 20/200 or worse (39%).

As determined with the Functional Vision Screening Questionnaire (Horowitz, Teresi, & Cassels, 1991), a 15-item index used to indicate whether or not difficulty is experienced in specific functional areas (e.g., reading newspaper print, recognizing faces across a room), participants reported on average 10–11 functional difficulties (potential scores range from 0 to 15, with higher scores indicating more difficulty). Furthermore, on a modified version of the Older Americans Resources and Services Multidimensional Functional Assessment Questionnaire (Center for the Study of Aging and Human Development, 1975), which included both personal (PADL, 6 items) and instrumental (IADL, 7 items) activities of daily living, nearly half of the participants reported some degree of difficulty

Table 1. Descriptive Information for Sample Characteristics ($N = 364$)

Variable	Mean (*SD*)	%
Age	82.79 (6.34)	
Gender (women)		63
Race (White)		94
Marital status (married)		42
Income (adequate)		68
Education		
At least high school		87
Completed college/graduate		34
Visual acuity		
20/60 to 20/100		43
20/120 to 20/190		18
20/200 or worse		39
Functional vision loss	10.58 (2.76)	
Functional disability: PADL		
No difficulty		32
Some difficulty on one task		23
Some difficulty on two or more tasks		45
Functional disability: IADL		
No difficulty		7
Some difficulty on one task		9
Some difficulty on two or more tasks		85

Note: IADL = instrumental activities of daily living; PADL = personal activities of daily living.

with two or more PADL tasks and the majority reported some difficulty with two or more IADL tasks.

Assessment of Challenges and Control Strategies

In order to assess specific strategies that are used for the everyday maintenance of control, participants were asked a series of open-ended questions. The structure of this assessment reflected three psychosocial domains of adaptation (functional, social, and psychological), which have been shown to be affected by age-related vision loss (Burmedi et al., 2003a, 2003b). Questions were phrased as follows:

Functional challenges: "I would like you to think for a moment about how you conduct your everyday activities both inside the home, (e.g., paperwork, cleaning, or cooking), and outside the home (e.g., going to a doctor's appointment, shopping, walking in your neighborhood, or driving a car). What challenges or difficulties do you face in this area because of problems with your vision?"

Social challenges: "I would like you to think for a moment about your social life, that is, your general relationships with family members and close friends, giving and receiving help and emotional support, and your participation in activities with family and friends. What challenges or difficulties do you face in this area because of problems with your vision?"

Psychological challenges: "I would like you to think for a moment about your feelings and thoughts about having vision problems. What are your feelings and thoughts in this regard?"

Each reported challenge question was followed up with the probes "How do you deal with these challenges? What do you do to deal with them?" If a participant reported strategies without prompting, the interviewer allowed the narrative to evolve until it was clear how the participant dealt with the challenge. The interviewer then guided the participant toward the next challenge. Similarly, if a participant reported challenges or strategies on the "wrong domain" (e.g., social challenges in response to the question about functional challenges), the interviewer would allow for this elaboration and later return to the previous domain focus. Responses to the open-ended questions were digitally recorded and transcribed. Intensive training of research assistants to ensure interviewer skills and narrative data quality involved a systematic procedure including observation of a skilled interviewer, mock interviewing, being observed and receiving feedback, and regular reviewing of transcripts.

Coding of Challenges and Control Strategies

Narrative data were coded using Atlas/ti (Muhr, 1997), a software package designed to facilitate qualitative analysis. It is noted that the coding of challenges and related findings are not reported here due to the focus of this paper on control strategies. Detailed descriptions of specific coding rules for both challenges and strategies are specified in a coding manual available from the authors. Control strategies codes were derived using the definitions formulated by Heckhausen and associates (e.g., Heckhausen, 1999) for both the four general categories (Selective Primary Control, Compensatory Primary Control, Selective Secondary Control, and Compensatory Secondary Control) and for the subcategories (e.g., for Selective Primary Control: invest time, invest effort, learn new skills, and fight difficulties). Because the theoretical definitions alone were not sufficient to code effectively, we enhanced these definitions with additional explanations included in the coding manual. Moreover, several subcategories were added under the four main strategy groups based on insights from prior research on this population and emerging themes in the data. For example, previous evidence on the intricate role of different types of social support for persons with age-related vision loss (e.g., Reinhardt, 1996) led us to differentiate the life-span control strategy "recruit other's help" by distinguishing formal from informal sources of support. *Formal help* was defined as any kind of professional help. *Informal help* was further specified according to whether it was initiated or accepted by the participant. We formed an additional support category under Compensatory Primary Control termed *Enable* which captured instances in which participants specifically ask others to adopt a system that made it possible for them to independently accomplish a task (e.g., if you speak to me when you see me, I can more easily recognize you). This enablement strategy emerged in both our pilot data and in the first sets of reviewed narratives from the baseline sample.

We also added subcategories because nuances that had not been specified as strategies in the theory appeared to

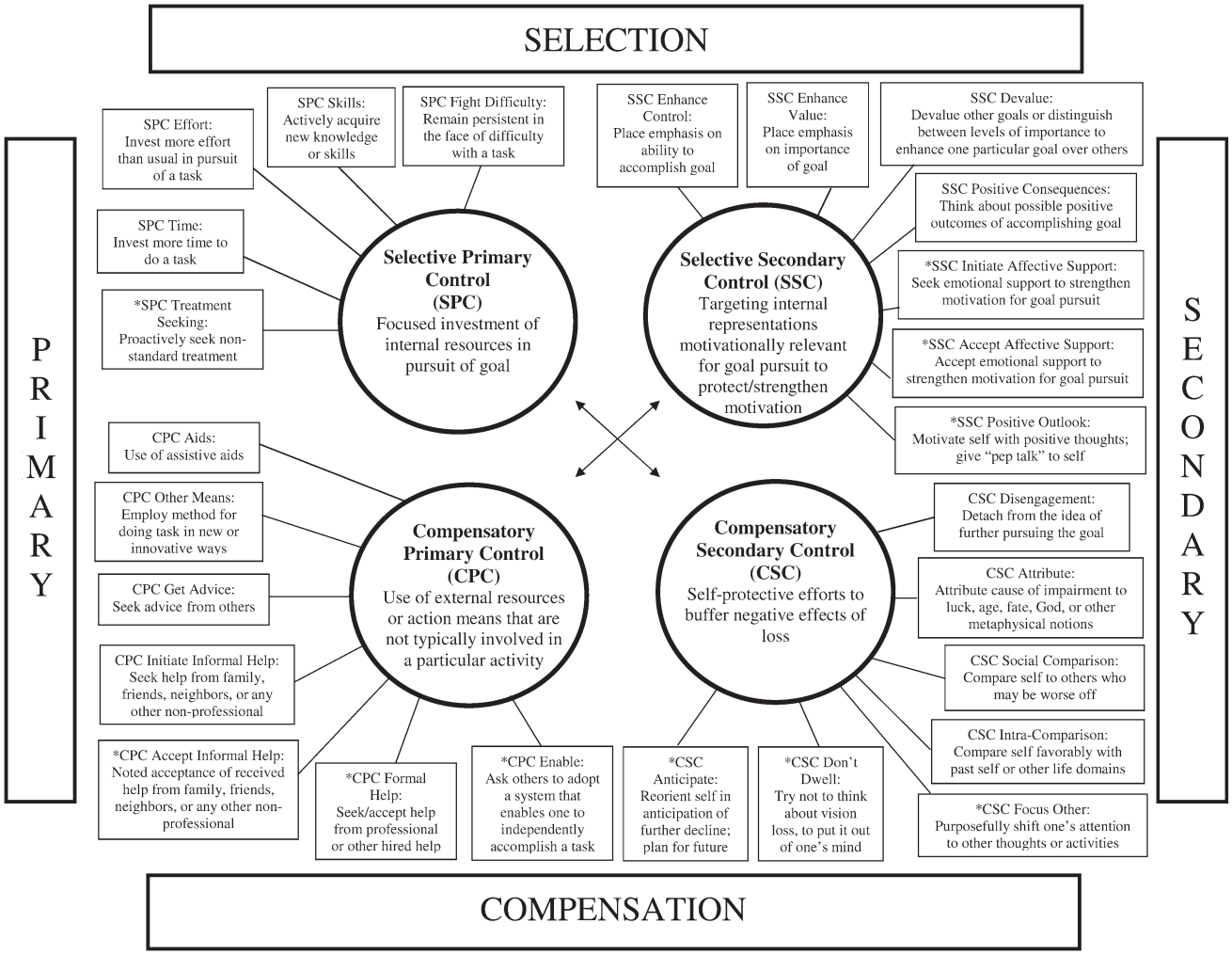

Figure 1. Control strategy main and subcategories with definitions. *Note.* Subcategories formulated in addition to those defined by Heckhausen (1999) are marked with an asterisk.

emerge from our narrative data. These additions were discussed with and supported by project consultants Heckhausen and Schulz because it became clear that the narrative material could not be exhaustively captured with the existing subcategories alone. "Seeking Treatment" was added as a subcategory under Selective Primary Control category to capture persistent efforts of treatment seeking that seemed to go beyond mere compliance with recommended treatment plans. We further added three Selective Secondary Control (SSC) subcategories that seemed to strengthen participants' motivation for goal pursuit: SSC Positive Outlook to capture instances of insisting on maintaining a positive attitude in the face of difficulty and two SSC Affective Support categories to represent either the initiation or acceptance of affective support from others. Finally, we added four Compensatory Secondary Control (CSC) subcategories: CSC Don't Dwell representing efforts to take one's mind off of the problem, CSC Focus Other to reflect instances of purposefully shifting attention to other thoughts and activities, CSC Anticipate representing attempts to reorient oneself in anticipation of further visual decline, and CSC Humor to reflect instances where humor was used in a self-protective manner. All categories and their respective definitions are shown in Figure 1. Subcategories we formulated in addition to those defined by Heckhausen (1999) are marked with an asterisk. (Drawing on our experiences during the process of coding pilot data in the planning stage of the study, we also formulated some general coding guidelines to be followed, such as (a) read the whole interview through once before starting to code, (b) consider all contextual information while coding, (c) code every instance of coping activity. Try to capture the whole thought. This means that the unit of analysis could be made up of a part of a sentence, a whole sentence, or a paragraph, (d) if a strategy is reported more than once, only assign another code if the strategy is used in dealing with a different challenge, (e) code only if reported information is vision related.)

The process of developing and refining the coding system and guidelines progressed in several stages. The basic set of definitions and rules described earlier that had been successfully used with pilot data were applied to sets of 10 transcripts at a time by the senior investigators. Coding decisions were compared, disagreements discussed, and definitions and rules further refined to improve clarity. This was done until the percent agreement among the senior investigators was more than 80%. Then the research assistants were trained to use the coding system. The training period was considered completed when percent agreements of 80% or more were reached consistently. After that, all transcripts were coded by the research assistants and Cohen's kappa was used instead of percent agreement. Randomly selected transcripts were reviewed by a senior investigator on an ongoing basis. Cohen's kappa was calculated for each of these transcripts to ensure continuous quality control. Throughout the coding phase, an average kappa of .82 was maintained.

Findings

Control Strategy Use

Descriptive information for strategies with sample quotes from the narrative data are shown in Table 2. Although all four general strategy types were reported, only Compensatory Primary Control strategies were reported by nearly all participants (99.7%). At least one Compensatory Secondary Control strategy was reported by a majority of participants (77%) and at least one Selective Primary Control strategy by about half of the participants (53%). Selective Secondary Control was the least frequently mentioned, with only 21% reporting at least one instance of using this type of strategy. A similar pattern emerged with respect to the variety of strategies reported by each person. On average, participants reported about four different Compensatory Primary Control strategies (M = 3.91; SD = 1.01, observed range 0–7) compared with one to two different Compensatory Secondary Control strategies (M = 1.53; SD = 1.22, observed range 0–6). Few participants reported multiple Selective Primary Control (M = .77; SD = .86, observed range 0–4) or Selective Secondary Control strategies (M = .25; SD = .53, observed range 0–3).

In the Compensatory Primary Control (CPC) category, CPC Other Means and CPC Aids were reported by more than 90% of participants and CPC Initiated Informal Help and CPC Accepted Informal Help were mentioned by more than 70% each. CPC Formal Help strategies were mentioned by only 45% of participants, whereas reports of CPC Enable and CPC Advice were rarer (8% and 3%).

In the Compensatory Secondary Control category, CSC Focus Other, CSC Intraindividual Comparison, and CSC Social Comparison were the most frequently mentioned, each reported by about one third of participants. Instances of CSC Attribute and CSC Disengage appeared less frequently (18% of participants mentioning each), whereas CSC Don't Dwell, CSC Anticipate, and CSC Humor were even less common (6%, 4%, and 2%, respectively).

In the Selective Primary Control (SPC) category, SPC Effort and SPC Fight Difficulty appeared the most often (31% and 20%, respectively), as opposed to SPC Skills, SPC Time, and SPC Proactive Treatment Seeking, which only about one tenth of participants mentioned for each strategy (7% to 11%).

Finally, in the Selective Secondary Control category, which was the least frequently reported overall, even the most common strategy, SSC Positive Outlook, was reported by only 8%, followed by SSC Enhance Value (5%), SSC Devalue (4%), and SSC Affective Support Accepted (3%). The remaining subcategories were rarely mentioned (each <3%).

Control Strategy Use by Impairment Level

To assess control strategy use depending on level of vision impairment, we created a grouping variable based on the subjective functional vision measure (Horowitz et al., 1991) and then examined whether not frequency and percentage of strategies used differed for the three groups. The rationale for the three-group comparison was both empirical and conceptual. The Functional Vision Loss scale is a standardized widely used measure with a cutoff score (≥9) indicating significant low vision that has been validated against visual acuity of 20/70 or worse, which reflects significant vision impairment (Horowitz, 1996). We initially considered a two-group comparison based on the cutoff score. However, because we found that this would place the majority of our participants in the more impaired group and that within this group, participants would range from moderate to more severe impairment, the three-group comparison allowing a grouping in mild, moderate, and severe impairment seemed to be the most informative and meaningful. The least impaired group consisted of 75 participants with scores ranging from 2–8 (M = 6.36; SD = 1.6), a more moderate group had 142 participants with scores ranging from 9–11 (M = 10.16; SD = .82), and the severe group had 147 participants with scores of 12 or higher (M = 13.14; SD = 1.02).

Contrary to prediction, when examining the four general categories, significant group differences were largely nonexistent, with the exception of an unexpected trend toward more use of Selective Primary Control with higher levels of impairment (see Table 3). However, there were some interesting differences in individual strategies. As expected for the category Compensatory Primary Control, all individual strategies representing using help from other people (CPC Informal Help Initiated, χ^2= 12.04**; CPC Informal Help Accepted, χ^2= 15.93**; and CPC Help Formal; χ^2= 12.12**), as well as using alternative means (CPC Other Means, χ^2= 6.27*), were increasingly prominent with higher levels of impairment. There was a trend in the opposite

Table 2. Number and Percent of Participants Reporting Control Strategies and Corresponding Sample Quotes

Control Strategy	*N*	%	Quote
Compensatory Primary (CPC)			
CPC Other Means	353	97	I make contrast everywhere, I just bought new white mugs so I can see where the coffee is and I'm constantly figuring out contrast.
CPC Aid	343	94	Reading, writing my checks, my bills. I use magnifying glasses and additional light.
CPC Informal Help Initiated	276	76	Well if I go out to dinner, I ask somebody else to read the menu to me.
CPC Informal Help Accepted	258	71	My friend comes and will prepare my meals for me because I don't have sufficient sight to do them properly. I'm really very fortunate.
CPC Help Formal	164	45	I have somebody come in once a week. She goes to the supermarket with me and she can read the labels for me.
CPC Enable	28	8	If I meet somebody, I'll always say, "Hello, nice to meet you. When you see me, say hello first because I won't recognize you."
CPC Advice	2	3	I have a friend who's a geriatric psychologist. I asked her and she said, "no, you don't have depression. You're sad because you lost something." That I understood.
Compensatory Secondary (CSC)			
CSC Intraindividual Comparison	139	38	I thank my lucky stars that it isn't worse. Everything is relative. I wouldn't want a fatal disease either, so this isn't so bad.
CSC Focus Other	136	37	I try to think of something else. I might look at the trees and the shadows of the trees.
CSC Social Comparison	109	30	This guy has Alzheimer's. I am thinking what am I feel sorry for, at least I know where I am.
CSC Attribute	66	18	I think just aging regardless of the vision is a challenge. It's all part of the aging process.
CSC Disengage	66	18	It's not life and death to give up playing tennis, it's just something I enjoyed and I now enjoy watching it. I try to watch as much as I can and appreciate it.
CSC Don't Dwell	23	6	I try to not have it annoy me. I put it in the back of my mind.
CSC Anticipate	13	4	I feel that I have to go through all my papers as much as I can, as long as I can still see them to some extent.
CSC Humor	6	2	In the ballet it's amusing because I keep going but the ballerinas have no feet. It makes it a very interesting show, like angels floating. I probably never could see what their feet were doing terribly well anyway. You see, it's a question of exaggeration of something that's always existed, which I'm used to.
Selective Primary (SPC)			
SPC Effort	114	31	I push myself to do things. I try to be as self-sufficient as I can.
SPC Fight Difficulty	71	20	I'm a very determined person. I'm not going to let anything stop me.
SPC Skills	39	11	I try to find out as much information as I can. I try to imagine scenarios, and what is available in those situations to take care of it.
SPC Time	28	8	The hardest thing I have to do is try to read or make my bills. I just have to take my time.
SPC Seeking Treatment	27	7	I'm trying to find some way to recover some of it. I do see all kinds of doctors regularly and I try different things.
Selective Secondary (SSC)			
SSC Positive Outlook	29	8	I can see where I can really become very bitter but I have found that it serves no purpose, so I try to keep my slant on my shortcoming on the upbeat.
SSC Enhance Value	19	5	The reading is very important to me. I live alone, I don't love television, and I can't be read to. . .I have to read myself.
SSC Devalue	16	4	It's silly for me to subscribe to magazines that I can't read, and do other things like that.
SSC Affective Support Accepted	12	3	I do have one friend who's in the same situation. In fact, she's further advanced in deterioration than I am. So we compare notes and we give each other hints.
SSC Enhance Control	8	2	I function. I function in everything that I have to do. Whatever I want to do I can do.
SSC Affective Support Initiated	5	1	Well, I was angry, I spoke to my daughter and she said, "You have to cope with it."
SSC Positive Consequences	2	0	Sometimes I can sign my name or will struggle to write a check myself. When I look at the check like this and finish writing it I feel like I've accomplished something.

Note: Percentages are based on $N = 364$.

direction for CPC Aid, as predicted. Thus, it seems that using help from others and trying to overcome challenges by employing alternative means or approaches were more common among those who were more impaired, whereas the use of aids was more common among those with lower impairment levels.

Although we had no specific predictions for individual strategies in the categories Selective Secondary Control and Compensatory Secondary Control, group differences appeared for two subcategories: SSC Positive Outlook was more prominent among those who were more impaired and CSC Don't Dwell was more prominent among those who were less impaired. These findings suggest that effort "not to dwell on it" tends to be an approach that people no longer engage in when their vision problems become more severe. Trying to maintain a positive outlook in response to vision-related challenges, on the other hand, seems to become more prevalent with more severe impairment.

Discussion

Study findings revealed a rich array of strategies that older adults with AMD use in their daily life to overcome the challenges of visual disability. Importantly, findings

Table 3. Control Strategy Use by Level of Vision Impairment

	Vision Impairment						
	Mild		Moderate		Severe		
	No.	%	No.	%	No.	%	χ^2
Selective Primary Control (SPC)	32	43	72	51	87	59	5.73†
SPC Effort	22	29	41	29	51	35	1.31
SPC Fight Difficulty	12	16	24	17	35	24	2.94
SPC Skills	7	9	13	9	19	13	1.26
SPC Time	3	4	10	7	15	10	2.83
SPC Treatment Seeking	4	5	12	9	11	8	.70
Compensatory Primary Control (CPC)	74	99	142	100	147	100	3.86
CPC Other Means	70	93	137	97	146	99	6.27*
CPC Aid	73	97	136	96	134	91	4.51†
CPC Informal Help Initiated	46	61	109	77	121	82	12.04**
CPC Informal Help Accepted	41	55	99	70	118	80	15.93***
CPC Help Formal	21	28	66	47	77	52	12.12**
CPC Enable	6	8	11	8	11	8	.02
CPC Advice	0	0	1	0	1	0	.52
Selective Secondary Control (SSC)	15	20	27	19	34	23	.79
SSC Positive Outlook	3	4	8	6	18	12	6.33*
SSC Enhance Value	5	7	5	4	9	6	1.39
SSC Devalue	6	8	6	4	4	3	3.31
SSC Affective Support Accepted	0	0	6	4	6	4	3.23
SSC Enhance Control	2	3	2	1	4	3	.68
SSC Affective Support Initiated	0	0	3	2	2	1	1.62
SSC Positive Consequences	0	0	0	0	2	1	2.97
Compensatory Secondary Control (CSC)	52	69	112	79	117	80	3.34
CSC Focus Other	24	32	51	36	61	42	2.12
CSC Social Comparison	21	28	46	32	42	29	.67
CSC Attribute	17	23	25	18	24	16	1.39
CSC Disengage	13	17	26	18	27	18	.04
CSC Don't Dwell	7	9	14	10	2	1	10.26**
CSC Anticipate	2	3	3	2	8	5	2.55
CSC Intraindividual Comparison	23	31	56	39	60	41	2.32
CSC Humor	0	0	3	2	3	2	1.59

Note: †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; $df = 2$.

demonstrated how inventive and resourceful these older adults can be when it comes to the strategies that they use to try to deal with these challenges. Moreover, findings showed the benefits of a methodological approach to investigating chronic disability in later life that combines a theory-guided effort (top-down approach) with thorough grounding in narrative data (bottom-up approach). This allows for an anchoring of information on adaptation processes in concrete daily life situations that are uniquely relevant to each individual, paired with a theory-driven examination and conceptualization of this information. As we had hoped, we found that the participants' narratives reflected both the four general categories of control strategies as well as the subcategories formulated by the authors of the theory. Moreover, also as anticipated, we found that exhaustive representation of the data required us to define some new subcategories (e.g., different types of help seeking). Our study is the first to show with such level of detail that control-related behavior as conceptualized by the life-span theory of control can be found in open-ended accounts of people with visual disability. This in itself constitutes new empirical support to the validity of this theory's constructs. Moreover, the prominence of disengagement and self-protective strategies (Compensatory Secondary Control) in our study population confirms our proposition that conceptual frameworks that specify these types of processes in more detail are the most useful for the study of adaptation to late-life disability.

Prominence of Individual Control Strategies

As expected, we found that Compensatory Primary Control (i.e., use of means that are not typically employed) was the most prominently used, providing further support for the critical role of these types of strategies for dealing with chronic disability. It is also not surprising that strategies in this category showed the most differential pattern by impairment level. In particular, we found that enlisting or accepting support to deal with daily challenges was increasingly prominent with more severe impairment. This may appear, but is not necessarily, inconsistent with the finding by Wahl and colleagues (2007) who proposed that compensatory primary control (in the general OPS, this category reflects primarily help seeking) will increase first

after the diagnosis and then decrease because initial adjustments are made. Impairment level alone is not an indicator of length of impairment, although it is likely that milder levels are experienced at an earlier point. However, future work will have to clarify the role of impairment severity versus time since onset of the eye disease to be able to evaluate the influence of each on help seeking.

With respect to the different types of help from others, it is noteworthy that informal help accepted from others was almost as common as self-initiated informal help, suggesting that both types of support use are important strategies when confronted with a disability. It is also clear that Formal help is a needed type of support and that this need increases with worsening impairment. Although the use of CPC Enable, which captures instances where others are asked to adopt a system that enables the impaired person to independently accomplish a task, was uncommon, this is an interesting strategy conceptually because it allows for a way of using help that retains some of the person's independence. Both CPC Informal Help Initiated and CPC Enable are characterized by the person's agency, but only in the latter case does the person specifically seek to remain as independent as possible during instances of help receipt. Future research should examine under what circumstances each of the help strategies may become more or less adaptive and how the pattern of help use may change over time.

When it came to the use of technical aids and other means, we found a trend for the predicted pattern, which was more use of other means and less use of aids with more severe impairment. Although this finding was less pronounced than expected, it suggests that the reversed pattern of leaning more toward adopting a new system versus using assistive devices to do things as one did before may indeed occur when vision worsens. This is another important question to address with longitudinal data in future research. However, the present findings do demonstrate that in the category of compensatory primary control, adaptive aids and other means are used the most frequently, but that with more severe impairment, the frequency pattern of the help-seeking strategies becomes increasingly similar to that of these two strategies.

Contrary to theoretical expectation, we did not find a clear pattern of higher usage in Compensatory Secondary Control strategies with more severe levels of impairment. Rather, these strategies were overall the second most frequently reported among all four main categories. This indicates that disengagement or self-protective efforts are needed even under the condition of milder impairment, which is likely to reflect an earlier point in the adaptation process to vision-related disability. One reason for this may be that people with early-stage AMD use self-protective strategies in order to cope with the anticipation of the progressive decline. It also suggests that self-protective strategies such as focusing on other things when upset, reminding oneself of other good things in one's life or of others that may be faring worse, can very well coexist with goal engagement efforts, in particular, those of the compensatory type. The only compensatory secondary control category that showed a difference in use by impairment level (less use with higher impairment) was the attempt not to dwell on vision-related problems. This makes sense if one considers that efforts to ignore the problem are likely to be increasingly ineffective when vision gets worse. However, questions about the effectiveness or adaptiveness of individual strategies can only be addressed by linking strategy use with adaptational outcomes, which exceeded the scope of this paper but is an important next step for future research.

Findings for Selective Primary Control were partially unexpected. However, although there was a trend toward more use with higher impairment level in the general category, the individual categories were reported with similar frequency across levels of impairment. This suggests that, as we had predicted, the effortful investment of internal resources is somewhat equally needed at all impairment levels. At first glance, our findings with regard to Selective Primary Control may seem inconsistent with the theoretical prediction that selective strategies are likely to decrease when a goal is no longer feasible. Yet, we believe that such a decrease is more likely to be observed when strategy use is examined in response to specific goals. For example, when reading with visual aids becomes too hard, a person is likely to invest less effort in this and instead start using compensatory options such as talking books or having other people read to them. However, on the level of analysis that we have presented in this paper, which looks at overall strategy use in response to disability-related challenges, we would argue that regardless of level of impairment, people with a chronic disability generally need high investment of internal resources (effort, time) and strategies to bolster their motivation in order to maintain functioning. So, although there might be some individual goals in which they invest less effort, there are always going to be many others in which high effort is and needs to be invested.

With regard to Selective Secondary Control, we did not initially expect that only so few participants would report these types of motivational strategies. However, narrative material reflecting this category, specifically, efforts to maintain a positive outlook, seemed to be more prevalent with more severe impairment. Thus, we would be cautious to conclude from our findings that these motivational strategies were rarely used in our study population. It may mean that motivation-fostering cognitions thought to represent the Selective Secondary Control category are not likely to emerge from narrative self-report data because they tend to be non-intentional in nature. Thus, it might be that these types of strategies can be endorsed when they are part of a scale because people recognize their own thinking in the items, but they would not necessarily think to talk about

these strategies as ways of dealing with challenges. Future research could specifically probe for such internal cognitive strategies to determine whether they would be more likely to be mentioned than when left to spontaneous reporting by participants.

Limitations and Conclusion

As participants were drawn from a population who had contacted a vision rehabilitation agency for services, there may be limits to generalizing these findings to visually impaired adults who do not seek out services or to adults with other chronic impairments (e.g., hearing). However, this should not limit the relevance of determining the role of control strategies in dealing with daily challenges due to vision impairment. Moreover, age-related vision loss constitutes a prototypical case as it shares key features with other chronic age-related disabilities, such as gradual onset, progressive decline, and varying levels of disability. Therefore, the present study can serve to inform and guide future research that deepens understanding of adaptation to other age-related disabilities. For example, investigators who are interested in using the control framework for the study of other age-related disabilities may want to use the approach of strategy assessment anchored in specific challenges or may want to make sure that aid use and different types of help from others are captured as strategies, even when a more structured approach is employed. Moreover, showing that a rich repertoire in strategies can be captured with life-span theory of control concepts is an important first but certainly limited step, which should be followed by an assessment of the benefits of these strategies for adaptational outcomes. Finally, future work will be important that examines how both the nature of challenges and the strategies that are used to deal with these challenges change over time as a result of changes in vision function and disability.

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Correspondence

Address correspondence to Kathrin Boerner, PhD, Jewish Home Lifecare, Research Institute on Aging, 120 West 106th Street, New York, NY 10025. Email: kboerner@jhha.org

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