The Adaptiveness of Selection, Optimization, and Compensation as Strategies of Life Management: Evidence From a Preference Study on Proverbs

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Proverbs were used to examine whether laypeople’s conceptions of or preferences for life-management strategies are consistent with the model of selection, optimization, and compensation (SOC model). The SOC model posits that there are three fundamental processes of life management: selection, optimization, and compensation. In two studies ($N = 64; N = 131$), young (19–32 years) and older adults (59–85 years) were asked to match proverbs to sentence stems indicative of life-management situations. Of the proverbs, half reflected one component of SOC and half alternative, non-SOC life-management strategies. SOC-related and alternative proverbs were matched on familiarity, understandability, and meaningfulness. Two main results were obtained: Young and older adults chose proverbs reflecting SOC (a) more frequently and (b) faster than alternative proverbs. Study 3 ($N = 60, 19–32$ year-old participants) ruled out that these results were due to an artifact resulting from a stronger, purely semantic relationship of the specific sentence stems with the SOC-related proverbs. Study 4 ($N = 48$ younger and older adults) and 5 ($N = 20$ younger adults) were conducted to test discriminant validity. In contrast with tasks involving long-term goal orientation and success, there were no preferences for SOC-related proverbs for life contexts involving relaxation or leisure. Taken together, results of these studies indicate that individuals, when asked to choose between alternative proverbs characterizing ways of managing life, prefer SOC-related proverbs.

This study links two research areas. One concerns a metatheory of successful life span development: selection, optimization, and compensation (SOC). The second research area is the use of proverbs as discussed in research on folk psychology.

Regarding the first research area, the SOC model takes the global view that at all stages of human development, individuals continually seek to master life through the application and orchestration of three components: Selection, optimization, and compensation (M. M. Baltes & Carstensen, 1996; P. B. Baltes, 1997; P. B. Baltes & Baltes, 1990; Freund & Baltes, 2000; Freund, Li, & Baltes, 1999; Marsiske, Lang, Baltes, & Baltes, 1995). In this theoretical context, selection refers to developing and choosing goals, optimization is seen as adaptive responses to losses in goal-relevant means, and compensation to the substitution of means when previous means are no longer available. (More specific definitions and instantiations are presented in Freund and Baltes, 1998, Table 1.) Using various techniques of assessment, psychologists have found supportive evidence for this theoretical approach (e.g., M. M. Baltes & Lang, 1997; Freund & Baltes, 1998, 2002; Wiese & Freund, 2001). For instance, individuals who report using SOC-related behaviors are found to be more frequently among the “successful” developers. The SOC model is beginning to be explored in other areas such as industrial–organizational psychology (e.g., Abraham & Haselager, 1997; Kelley, 1992; Miedler, 1993, 1997; Peng & Nisbett, 1999; Rogers, 1990). Proverbs can be defined as short statements summarizing knowledge or advice of how to deal with situations of everyday life (Miedler, 1997). Thus, we assume that proverbs are among those cultural productions that crystallize knowledge about human affairs including the planning and evaluation of everyday life and the meaning of life. Effective use of such proverbs can be linked to conceptions of practical wisdom (P. B. Baltes & Freund, in press; P. B. Baltes & Staudinger, 2000). According to this conception, wisdom is viewed as exceptionally rich knowledge about the fundamental aspects of the human condition (P. B. Baltes, Smith, & Staudinger, 1992; Dittmann-Kohli & Baltes, 1990; Smith, 1996; Staudinger & Baltes, 1996; Sternberg, 1990). Practical aspects of wisdom,
that is, the implementation of wisdom-related knowledge, are condensed in proverbs offering guidelines as to how one should act in a certain situation or context (P. B. Baltes & Freund, in press). Hence, if selection, optimization, and compensation are, as the SOC model posits, in fact basic processes of successful development, it should also be possible to identify proverbs reflecting these processes. Moreover, individuals should be able to identify SOC-related proverbs as being more adaptive processes of life management than alternative strategies.

In this study, these two research areas—the SOC model and proverbs as part of folk psychology—are linked by a focus on proverbs that contain knowledge or prescriptions in the sense of action-guiding maxims (Nichols, 1996) involving behaviors that can be designated as selection, optimization, or compensation. There are two central hypotheses. First, on the basis of the view that people in general have mental representations that reflect the theory of selection, optimization, and compensation, we suggest that proverbs are good candidates for such representations. Second, we predict that such a representation is stable or even shows positive change with age during adulthood.

Past research on adulthood intelligence has shown that outcomes of stability or positive cognitive development can be identified when tasks are used that are rich in cultural knowledge and involve content that reflects the cognitive or crystallized pragmatics of life (P. B. Baltes, Lindenberger, & Staudinger, 1998; Blanchard-Fields & Hess, 1996). An example of the cognitive pragmatics is wisdom. We consider proverbs part of the knowledge base associated with the cognitive pragmatics that is maintained throughout adulthood.

In addition to expecting that older adults would show good performance when matching proverbs to life problems, we expected some specific age differences. In past work, we have argued and found some supporting evidence that knowledge about the adaptiveness of and preference for SOC is a developmental process whose peak is in later phases of the life span. Moreover, we (Freund & Baltes, 2002) argue that the three components (S, O, C) are acquired successively with compensation being latest on average because losses become more prevalent with aging. Selecting and prioritization of goals from a larger pool of potentials can be viewed as a key challenge of young adulthood (Wiese, Freund, & Baltes, 2000). Adolescents are in a phase in life in which exploring and testing alternative options in various domains of life is highly important. Adults, however, are more pressured to actually select goals and commit to them to achieve desired outcomes. If young adults do not commit to goals in the private and professional domain (i.e., choosing a career, founding a family), they miss certain developmental deadlines, which might have accumulating detrimental effects for their further development (Heckhausen, 1999). Adults are also expected to achieve a “mature” position in society, and to invest efforts and means necessary to achieve high levels of functioning in their selected life domains (e.g., in their career).

As a consequence of these life span-developmental considerations, we expect younger adults to show a relatively stronger preference for proverbs characteristic of selection and possibly optimization. On the other hand, as losses in various life domains become more prevalent in older adulthood (e.g., health-related losses), compensation should be more typical of later adulthood and old age. Therefore, we expected older adults to show a stronger preference for compensation proverbs than younger adults would.

**Methods**

**Participants**

Participants were recruited through newspaper advertisement. The first sample was composed of 31 young (19–31 years of age, \( M = 26.3 \)) and 33 older adults (59–70 years of age, \( M = 64.7 \)). Gender was equally represented (50% women). The two age groups did not differ significantly regarding their verbal abilities (vocabulary subtest of the Wechsler Adult Intelligence Scale; Wechsler, 1982; young adults: \( M = 22.43, SD = 4.82 \); older adults: \( M = 20.21, SD = 4.10 \). As is typical for most cognitive aging research involving volunteer samples, the sample represented in this study has a positive selection bias. However, there is no indication that the degree of this bias varies with age. Specifically, with regard to education, most of the younger adults (71%) and older adults (63.6%) had completed the highest track of the German high school system, typically encompassing 13 years of school (Abitur).

A study dealing with a different topic permitted us to use another sample (\( N = 131; 51.1\% \) women; \( n = 68 \) young adults, 20–32 years old; \( n = 63 \) older adults, 59–85 years old), also recruited through newspaper advertisement, to examine the robustness of the results obtained in the first study. The second sample was also positively selected with regard to education: Again, most of the younger adults (91.2%) and most of the older adults (61.9%) had graduated from the highest track of the German high school system (Abitur). On a measure of verbal ability (Spot-a-word; Lindenberger & Baltes, 1997), and as is occasionally found for this age range for indicators of crystallized intelligence, young adults had somewhat lower scores than older adults did (\( M = 25.3, M = 29.0, p < .01 \)).

A third sample (\( N = 60; 51.7\% \) men), partly recruited through newspaper advertisement and partly contacted through other, unrelated studies conducted at our institute, took part in a control study. The sample consisted of younger adults only (19–32 years old; \( M = 25.3; SD = 2.9 \)). Again, the majority of the sample (78.3%) had graduated from the highest track of the German high school system, and 66.7% were currently university students. The third study was designed a posteriori to examine the potential role of a semantic confound of the sentence stems and the proverbs.

Studies 4 and 5 were aimed at testing the context specificity of the choice of proverbs. Both samples were primarily recruited from the subject pool of our center. The sample of Study 4 consisted of 48 younger (\( n = 26, 22–31 \) years old, \( M = 25.5, SD = 2.8 \)) and older adults (\( n = 22, 61–72 \) years old, \( M = 66.9, SD = 3.0 \)). Fifty-two percent of the participants were women. Sixty-seven percent had graduated from the highest track of the German high school system. The sample of Study 5 was composed of 20 younger adults...
(aged 20–31 years, $M = 25.3, \ SD = 3.1$). Thirty-two percent of the participants were women. Again, the majority of the sample (95%) had the highest school degree.

Note that in Studies 3 through 5, we included only younger adults because the focus was to rule out alternative explanations, not to test the central hypotheses of a preference for SOC across adulthood (Studies 1 and 2). The possible confounds inherent in the task used in the two main Studies 1 and 2 (i.e., semantic match between sentence stems and proverbs, and context-specificity of SOC) pertain to the main effect of preference of SOC-related over alternative proverbs. As age-related hypotheses are not central to the possible alternative interpretation, and for economic and pragmatic reasons, we chose to focus on one age group (younger adults).

**Materials**

The 36 pairs of proverbs used in this study for the situation-proverbs matching task (see below) were selected on the basis of a previous study (see Ostrop, 1996, for details; see also Appendix, Note 1). Two comprehensive collections of German proverbs (Bayer & Bayer, 1985; Simrock, 1846/1991) served as sources of the stimuli. Of those, a total of 418 proverbs were selected as reflecting life-management strategies. Sixty-eight percent of this pool reflected one of the SOC processes (selection: $n = 69$; optimization: $n = 131$; compensation: $n = 84$), 24% reflected alternative strategies ($n = 99$), and 8% were not classifiable because they reflected more than one life-management strategy ($n = 35$). Alternative strategies were defined as strategies reflecting a relaxed life style, waiting for opportunities and good fortune to present itself, and giving in to losses. In contrast, SOC-related proverbs reflect more agentive and active life-management strategies such as developing clear goals, investing into goal pursuit, and maintenance in the face of losses.

Out of the pool of 418 proverbs, only those proverbs on which five in-house experts of the SOC model unanimously agreed in their categorization and that were judged to be easily understandable and applicable to a variety of life domains were selected (see Table 1 for English versions of the proverbs). One hundred fifty-six proverbs were selected that reflected selection ($n = 34$), optimization ($n = 39$), compensation ($n = 27$), or unspecified alternative strategies of life management ($n = 56$). That it was possible to identify proverbs reflecting the three components of SOC can be regarded as the first evidence for the presence of SOC-related strategies in the body of cultural knowledge.

Of these 156 proverbs, 36 (18 SOC-related, 18 alternatives) were selected for inclusion in this study. All proverbs dealt with questions of life management. To arrive at this pool, we used the primary criterion of comparability of SOC-related and alternative proverbs in regard to a number of dimensions. In a pilot study, 59 young, middle-aged, and old adults rated all 156 proverbs on 12 dimensions (familiarity, general understandability, personal understandability, language difficulty, meaning specificity, clarity of meaning, certainty of meaning, frequency of usage, everyday meaningfulness, action-guiding function, imagery, and personal liking). Each dimension was rated on a 7-point rating scale with verbal anchor points (e.g., for familiarity: “I do not know this proverb at all” [1] to “I know this proverb very well” [7]; for general understandability: “proverb is, in general, very difficult to understand” [1] to “proverb is, in general, very easy to understand” [7]; for meaning specificity: “has many different meanings” [1] to “has one specific meaning” [7]; for personal liking: “I do not like this proverb at all” [1] to “I like the proverb very much” [7]). Interrater consensus across proverbs was very high (Cronbach’s $\alpha = .97–.99$). When factor analyzing these ratings (simple structure), we found that three factors resulted: (a) Familiarity, (b) Understandability (comprising the rating dimensions general understandability, personal understandability, language difficulty, meaning specificity, clarity of meaning, certainty of meaning, and frequency of usage), and (c) Meaningfulness of Proverbs (comprising the rating dimensions everyday meaningfulness, action-guiding function, imagery, and personal liking). As index for the stability of

### Table 1. List of English Examples of Proverbs Reflecting Selection, Optimization, Compensation, or Alternative Strategies of Life Management

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Proverb</th>
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<tbody>
<tr>
<td>Selection</td>
<td>Jack of all trades, master of none.</td>
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<tr>
<td></td>
<td>Those who follow every path never reach any destination.</td>
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<tr>
<td></td>
<td>You can’t have your cake and eat it, too.</td>
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<td></td>
<td>Between two stools you fall to the ground.</td>
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<tr>
<td></td>
<td>Don’t change horses midstream.</td>
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<td></td>
<td>One can’t have everything.</td>
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<tr>
<td>Optimization</td>
<td>Practice makes perfect.</td>
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<td></td>
<td>If at first you don’t succeed, try, try again.</td>
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<td></td>
<td>Make hay while the sun is shining.</td>
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<td></td>
<td>Procrastination is the thief of time.</td>
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<tr>
<td></td>
<td>Strike when the iron is hot.</td>
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<tr>
<td></td>
<td>God helps those who help themselves.</td>
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<tr>
<td>Compensation</td>
<td>Those without a horse walk.</td>
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<td></td>
<td>There are many hands; what one cannot do, the other will.</td>
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<td></td>
<td>When there’s no wind, grab the oars.</td>
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<td></td>
<td>A stitch in time saves nine.</td>
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<td></td>
<td>Desperate diseases call for desperate remedies.</td>
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<td></td>
<td>Don’t lose the ship for a hap’orth of tar.</td>
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<tr>
<td>Alternatives</td>
<td>Good things come to those who wait.</td>
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<tr>
<td></td>
<td>Time heals all wounds.</td>
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<td></td>
<td>Enough is as good as a feast.</td>
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<tr>
<td></td>
<td>Ignorance is bliss.</td>
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<td></td>
<td>You can lead a horse to water but you can’t make him drink.</td>
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<tr>
<td></td>
<td>What the eye doesn’t see, the heart doesn’t grieve over.</td>
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<tr>
<td></td>
<td>Enough is enough.</td>
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<td></td>
<td>Don’t shut the stable door after the horse has bolted.</td>
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<td></td>
<td>It’s no use crying over spilt milk.</td>
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<tr>
<td></td>
<td>Variety is the spice of life.</td>
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<tr>
<td></td>
<td>Everyone has his cross to bear.</td>
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<td></td>
<td>Man gets used to everything.</td>
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<tr>
<td></td>
<td>Time will tell.</td>
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<tr>
<td></td>
<td>Tomorrow is another day.</td>
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<td></td>
<td>Leave well enough alone.</td>
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<tr>
<td></td>
<td>There’s many a slip ‘twixt cup and lip.</td>
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<td></td>
<td>After a rain comes sunshine.</td>
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<tr>
<td></td>
<td>Don’t cross a bridge til you come to it.</td>
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</tbody>
</table>

Note: German proverbs were used as stimulus material. As proverbs are extremely difficult to translate, we have tried to provide English proverbs that are roughly equivalent to the German proverbs used in the reported studies.
the factor solution across all 156 proverbs, congruency coefficient was calculated (Gorsuch, 1983). For 97% of the proverbs, the congruency coefficient of the three factor solution was greater than .94, indicating an adequate factor solution.

On the basis of their similarity in factor loadings, 18 proverbs reflecting selection, optimization, or compensation (six proverbs for each of the three components) were matched with 18 alternatives. As can be seen in Table 2, on average, values on familiarity, understandability, and meaningfulness of both SOC-related and alternative proverbs were above or near the scale mean (i.e., > 3.5). This means that raters judged the proverbs used in this study as being rather familiar, understandable, and—with the exception of selection—also rather meaningful. The lower meaningfulness value for selection results in a conservative test of our hypothesis of also rather meaningful. The lower meaningfulness value for selection results in a conservative test of our hypothesis of

Table 2. Means and Standard Deviations of Ratings of Familiarity (Single Item), Understandability, and Meaningfulness (Factor Scores), Across the SOC-Related and Alternative Proverbs Used as Stimulus Material

<table>
<thead>
<tr>
<th>Proverb type</th>
<th>Familiarity M</th>
<th>SD</th>
<th>Understandability M</th>
<th>SD</th>
<th>Meaningfulness M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection</td>
<td>4.4</td>
<td>2.3</td>
<td>5.9</td>
<td>0.8</td>
<td>2.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Optimization</td>
<td>4.3</td>
<td>2.4</td>
<td>6.0</td>
<td>0.6</td>
<td>4.9</td>
<td>0.8</td>
</tr>
<tr>
<td>Compensation</td>
<td>3.4</td>
<td>3.5</td>
<td>5.7</td>
<td>0.7</td>
<td>4.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Alternatives</td>
<td>4.3</td>
<td>2.0</td>
<td>5.7</td>
<td>0.9</td>
<td>4.4</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Note: SOC = selection, optimization, and compensation.

Procedure

First, participants were familiarized with the proverbs by rating them on various dimensions (e.g., concreteness) to ensure that participants processed information contained in each proverb. At the end of the familiarization phase, participants rated the familiarity of each proverb. As in pilot work, the selection and optimization proverbs did not differ significantly from alternative proverbs (ps > .17). Participants indicated less familiarity, however, with proverbs reflecting compensation than with alternative proverbs, t(64) = −6.63, p < .001. For our design, this is a conservative arrangement because, as familiarity is related to preference (Zajonc, 1980), one might expect the more familiar alternative proverbs to be favored over the less familiar compensation proverbs with which they were matched. As expected, older adults gave higher familiarity ratings to all proverbs than younger adults did; for SOC-related proverbs, t(63) = −3.11, p < .01; for alternative proverbs, t(63) = −5.31, p < .001.

The second step was the critical one for the present study. Participants performed a life-management–context proverb-matching task. Sitting in front of a computer screen, they were asked to indicate as fast as possible which of the two competing proverbs presented simultaneously on the screen matched the situational sentence stem best by pressing a button. Choice of proverb and response time were recorded. Each choice involved selecting between one selection-, optimization-, or compensation-related proverb and one alternative. In total, 36 choices were made.

We view the frequency of choice and the reaction times as reflecting knowledge not about the proverbs themselves but about the match between the life-management context provided by the sentence stems and the proverbs. Because the proverb pairs offered for each choice were comparable with regard to familiarity, it is not the knowledge about the proverbs themselves but the knowledge about the relatively better match with a given context that is relevant here. In this sense, one might prefer the term preference rather than the term knowledge.

Results

Data were analyzed with regard to two questions: (a) Did participants choose proverbs reflecting one of the components of SOC more often than alternative proverbs? and (b) did participants choose proverbs reflecting the components of SOC faster than they chose alternative proverbs?

Choice of Proverbs

Figure 1 shows the mean choice of proverbs reflecting components of SOC or their alternatives aggregated across 12 sentence stems (choice of alternative was coded as 0, choice of SOC proverb was coded as 1) for the two age groups. The null hypothesis suggests a probability of .5 regarding the choice of SOC versus alternative proverbs. Inspection of the confidence intervals (95%) shows that young and older adults chose proverbs reflecting SOC more often than they chose alternative proverbs. The t tests against the criterion of .5 (chance) revealed the following statistics for young adults: selection, t(30) = 8.92, p = .000; optimization, t(30) = 8.05, p = .000; compensation, t(30) = 5.24,
Figure 1. Mean frequency of choice for selection-, optimization-, and compensation-related over alternative proverbs by age group (Study 1).

Figure 2. Mean response time for selection- (S), optimization- (O), and compensation (C)-related and alternative proverbs by age group (Study 1).

$p = .000$; for older adults: selection, $t(32) = 5.08, p = .000$; optimization, $t(32) = 7.11, p = .000$; and compensation, $t(32) = 8.21, p = .000$.

What about age differences? A 2 (age group) × 3 (process: SOC) analysis of variance (ANOVA) revealed a significant interaction of Age Group × Process, $F(2,61) = 6.87, p = .002$; $\eta^2 = .11$. Consistent with our expectations, univariate follow-up analyses showed that compared with older adults, young adults chose selection proverbs more often, $t(62) = 2.65, p = .01$, and chose compensation proverbs less often, $t(62) = -1.99, p = .05$. A statistical control analysis showed that verbal ability did not affect the results when entered as a covariate, $t(61) = 1.36, p = .18$.

**Response Time**

Response time on the matching task can be regarded as an indicator of the elaboration of the preference (e.g., Anderson, 1983). If laypersons’ (implicit or explicit) knowledge of the usefulness or preference of life-management strategies is consistent with the SOC theory, they should respond faster when choosing SOC-related proverbs compared with choosing alternative proverbs.

A 2 (age group) × 2 (type of proverb: SOC-related vs. alternative) × 3 (process: SOC) ANOVA supported this hypothesis. There was a significant main effect of kind of proverb, $F(2,61) = 12.3, p = .001$; $\eta^2 = .17$. When chosen, SOC-related proverbs were responded to more quickly than their matched alternatives were (see Figure 2; for younger adults: selection = 7,252 ms, alternative = 7,218 ms; optimization = 5,947 ms, alternative = 7,702 ms; compensation = 7,138, alternative = 7,454; for older adults: selection = 7,322 ms, alternative = 8,982 ms; optimization = 7,055 ms, alternative = 7,125 ms; compensation = 7,380, alternative = 10,212). In addition, there was also a significant interaction of age group, type of proverb, and process, $F(2,61) = 6.4, p = .003; \eta^2 = .09$. Again, verbal ability did not affect these results when entered as a covariate ($t = -0.84, p = .41$; see Appendix Note 3).

Univariate follow-up analyses showed that participants were faster in choosing optimization proverbs than selection proverbs, $t(63) = 2.26, p = .03$, or compensation proverbs, $t(63) = 3.25, p < .01$. The difference in response time for type of proverb (SOC related vs. alternative) was particularly pronounced with regard to compensation, $t(63) = -2.76, p < .01$. As expected, this effect was located in the group of older adults who responded significantly faster to compensation than to alternative proverbs, $t(32) = 2.19, p = .04$. This was not true for the young adults, $t(30) = -0.78, p = .44$.

**Study 2: Replication Study**

The primary objective of a second study had a different focus. With the second sample, we examined whether simulated (fantasized) variations (up, down) in resources would result in changes of preferences regarding proverbs. As described below, the simulation treatment did not produce such effects. However, this study permitted us to test the replicability of the findings obtained with the first sample.

Specifically, in this second study we presented a second sample of young and old adult participants the same stimulus material but applied two experimental conditions involving a simulation of a change in the level of resources available to them. One random subsample was asked to match the proverbs after they listened to a short vignette suggesting a resource limitation for themselves (receiving information about a fictitious illness and the ensuing likelihood of an early death). The other sample, before responding to the proverb-matching task, listened to a vignette suggesting for them a long and healthy life.

As mentioned already, this simulated treatment proved ineffective. No differences in choice or response speed were obtained between the two treatment conditions. Regarding the situation–proverb matching task, however, the main effect findings of the first study were replicated (see Appendix, Note 4).

Participants chose SOC-related proverbs significantly more frequently than chance ($M$ choice of selection = .70, of optimization = .79, of compensation = .70); $t$ tests...
against the criterion of .05 (chance) revealed significance of choice frequency for all processes: all rs(130) > 11.9, all ps = .000, and faster than comparison proverbs (response times in ms; selection = 6,423, alternative = 7,799; optimization = 5,773, alternative = 6,337; compensation = 6,783, alternative = 7,223), F(1,129) = 61.9, p < .001. However, the interactions involving age were not significant, either for mean choice—interaction of age by group by process (SOC): F(2,128) = 2.18, p = .11—or for reaction times—triple interaction effect of Age X Type of Proverb X SOC process: F(2,128) = .04, ns. There was also no main effect, F(1,129) = 1.8, p > .20, or interaction effect in response times involving age, F(1,129) = 0.08, p > .20.

Study 3: Control Study for Semantic Similarity

This study investigates the possibility that the preference of SOC-related over alternative proverbs might be primarily due to a closer semantic relationship between the sentence stems used as situational cues and the SOC proverbs than of the sentence stems and the alternative proverbs. Therefore, we did not specify sentence stems but asked participants to choose between a SOC-related and an alternative proverb in response to the question, “In general, which proverb gives the better advice?” (no sentence stem, general advice condition). This question was identical for all choices. Only after this task was completed were the participants given the standard proverbs-matching task involving the sentence stems used in Study 1 and 2. Note that the response times of the two conditions cannot be directly compared because in the standard condition, time was taken after the sentence stem had been shown for 4 s and when the two proverbs appeared on the screen. In the control condition no extra reading time for the question, “In general, which proverbs gives the better advice?” was allotted, as it remained the same for all 36 choices.

The results are clear cut and do not support the hypothesis of a semantic confound. In both conditions, participants chose SOC-related proverbs significantly more frequently than chance (specific sentence stems: selection = 79%, optimization = 84%, compensation = 79%; no sentence stem/ general advice: selection = 56%, optimization = 84%, compensation = 77%); t tests against the criterion of .5 (chance) revealed significance for all three processes under both conditions: all t(59) > 2.2, all ps < .03. Participants also responded faster (specific sentence stem: F(1,35) = 13.83, p < .001; no sentence stem/general advice: F(1,35) = 5.67, p < .02) to SOC-related proverbs when those proverbs compared with alternative ones (response times in milliseconds: specific sentence stem: selection = 7,147, alternative = 7,151; optimization = 5,248, alternative = 9,126; compensation = 6,110, alternative = 8,185; no sentence stem/general advice: selection = 5,551, alternative = 5,373; optimization = 4,417, alternative = 6,122; compensation = 5,211, alternative = 5,689; see Appendix, Note 5). Thus, these findings indicate that the preference of SOC-related over alternative proverbs was not primarily driven by the semantic content of the sentence stems used when asking participants to match SOC-related and alternative proverbs to situations of life management. In the control condition, no sentence stems were given (general advice condition).

Control Studies 4 and 5: Context Sensitivity of Proverbs

Two additional control studies were conducted to explore one additional alternative explanation, namely, whether SOC-related proverbs are more preferred because they, in general, have a higher match with any situation of life management. To test such a contextual demand specificity of the preference for SOC-related proverbs over proverbs reflecting alternative strategies of life management, we conducted two studies using instructions specifying contexts in which relaxation and leisure, rather than long-term goal orientation related to life management, was the primary goal.

In general, SOC-related life-management strategies are oriented toward the pursuit of goals that have a longer developmental time perspective and are the outcome of agentic behavior. In Studies 4 and 5, we used instruction where the primary focus was on more short-term goals and the content of these goals were more related to relaxation and leisure. Our general prediction was that in such demand contexts, people would not show preferences for SOC-related proverbs over proverbs reflecting alternative life-management strategies.

In Study 4, we used a paper-and-pencil version of the computer task used in Studies 1 through 3. All other aspects of the procedure were the same. To test for demand conditions that are less salient for long-time and agentic behavior, we used an instruction where the context in which the sentence stems were embedded was less on long-term developmental success than on immediate life enjoyment. Specifically, the instruction was

There are times in life during which the most important goal is not to be goal oriented in order to be “successful.” Sometimes, it is said, that this is the case when you think less about career and success. The goal is then to go with the flow and to let life unfold itself. . . . Now, which of the two proverbs fits better?

As expected, under this instruction there was no preference for SOC-related proverbs over proverbs reflecting alternative strategies of life management. Overall, participants chose non-SOC-related, alternative proverbs 53.5% of the time, t(47) against a criterion of .05 = −0.99, p = .33. This effect was stronger in younger adults (60.7% compared with 45% in the older adults), t(46) = −2.3, p = .03.

Having this first evidence for discriminant validity, we conducted one more study (Study 5) that would permit us to include reaction times as indicators of preference. In this instance, we used an instruction even more explicitly geared toward relaxation: “Imagine that, after a couple of exhausting months, you are finally on vacation. The only thing you want to do now is to relax. . . . Now, which of the two proverbs fits better?”

Again, results clearly support the hypothesis of demand-context sensitivity. Overall, participants chose in 69% of the cases the non-SOC, alternative strategies of life management over SOC-related proverbs, t test against the criterion of 0.5: t(19) = −3.87, p = .001. Moreover, when comparing the reaction times for choosing SOC-related or alternative proverbs, we found that participants tended to respond faster, t(17) = 1.99, p = .06, when choosing alternative
proverbs ($M = 4.883$ ms) than when choosing SOC-related proverbs ($M = 5.924$ ms). Study 5, then, shows that the pattern of results found in Studies 1 through 3 can even be reversed if the specific situational context of life management reflects the search for relaxation (leisure) rather than the pursuit of long-term developmental goals by agentic means.

**Discussion**

The life span theory of SOC holds that selection, optimization, and compensation are central processes of developmental regulation. The present study is the first attempt to project SOC into the realm of folk and common-sense psychology (Christensen & Turner, 1993; Haselager, 1997; Kelley, 1992). Proverbs can be viewed as condensed forms of cultural representations of pragmatic knowledge about fundamental aspects of human life (Mieder, 1997; Nichols, 1996). In this spirit, we used proverbs to examine whether people hold knowledge about the pragmatics of life that is commensurate with the processes of selection, optimization, and compensation expressed as their preference for SOC-related over alternative strategies of life management. Moreover, we examined whether there are theory-consistent age differences in such preferences.

Three results support the usefulness of such an approach to SOC. First, by reviewing a large pool of proverbs, we located proverbs that reflect selection, optimization, and compensation. Being able to identify proverbs reflecting SOC components is the first evidence for culturally mediated cognitive representations associated with the components that are at the core of SOC theory.

The second finding, involving choices of SOC-related proverbs, adds to this evidence. The results supported our hypothesis that mental representations related to the adaptiveness of selection, optimization, and compensation as strategies of life management are available when adults are faced with life-decision situations. When asked to match proverbs to sentence stems that presented such situations, young and older adults chose proverbs reflecting selection, optimization, or compensation more often than they chose alternative proverbs. The preference of SOC-related over alternative proverbs was robust when asked for “general advice” instead of matching them to a specific life-management situation. This finding rules out that the choice of SOC-related proverbs was primarily due to a closer semantic association of SOC-related proverbs to the sentence stems used in Studies 1 and 2.

Note also that the pool of SOC-related and alternative proverbs had been matched regarding the factors of familiarity, understandability, and meaningfulness. These factors were based on 12 dimensions of similarity. Thus, it seems unlikely that proverbs reflecting components of SOC were chosen because they were better known, easier to understand, or more meaningful.

Moreover, Studies 4 and 5 show that under specific conditions—namely, a life-management context demanding relaxation (leisure) rather than long-term, agentic goal orientation—the proverbs reflecting alternative—that is, non-SOC strategies of life-management—are preferred over SOC-related proverbs. This finding clearly shows that the non-SOC, alternative proverbs used in these studies capture life-management strategies that are, under certain circumstances, considered equally or even more desirable than SOC-related proverbs. Hence, it is unlikely that the results obtained in Studies 1 through 3 are due to a general higher match of SOC-related proverbs to just any situation of life planning or life management. When life contexts involve leisure, for instance, non-SOC proverbs are preferred.

Additional evidence supporting our hypothesis stems from the response times. Young and older adults chose SOC proverbs faster than they chose alternative proverbs. This result, we suggest, indicates that SOC-related notions in contexts requiring strategies of long-term life management are better elaborated preferences than the life-management strategies represented by alternative proverbs. Regarding the lack of age differences in response times, this finding lends further support to our hypothesis that older adults are well versed in SOC-related aspects of factual and procedural knowledge of the pragmatics of life. Note also that this result is consistent with research on choice reaction times of lexical decision tasks involving primarily semantic aspects (e.g., Friederici, Schriefers, & Lindenberger, 1998; Madden, 1992). In the current studies, using complex semantic items, we also did not find age losses in response times (see Appendix, Note 6). Our interpretation is that—not unlike research on verbal crystallized intelligence—matching proverbs to life-management situations reveals the high amount of practice in older adults. Contrary to negative age-related differences in response times in tasks assessing speed of information processing, older adults might show comparable response times in matching proverbs to life-management situations because they have relatively more practice and expertise in this behavior. At this time, this interpretation is speculative. It is, however, consistent with our general framework of cognitive life span development (P. B. Baltes et al., 1998).

Results concerning age differences in the preferences for specific SOC components are mixed. We had hypothesized that younger adults would show a stronger preference for selection and possibly optimization, whereas older adults would exhibit a stronger preference for compensation. Whereas Study 1, by showing that young adults chose selection proverbs more often and compensation proverbs less often than older adults did, provided hypothesis-supportive evidence, these age effects were not replicated in Study 2. This lack of replication of age effects might be due to instructional variations used in Study 2 (see Appendix, Note 4). This explanation is somewhat unlikely, however, as the two different instructions otherwise did not produce differential effects on the choice and response time. A more likely interpretation of the lack of replication is a problem of statistical power. The number of trials (i.e., 12 choices per process resulting in a total of 36 trials) may have been too few.

We would like to mention additional issues that are relevant when interpreting the results of this study. One is the question of whether the participants’ matching of SOC proverbs to situational sentence stems was actually based on mental representations of the SOC processes. This is the interpretation we would like to advance. However, we know only that participants preferred proverbs that, according to
our categorization, indicated selection, optimization, and compensation. In future work, it would be useful to study more directly the cognitive structure and processes that are connected with the proverbs used. A second concern is that in this cross-sectional study we are unable to disentangle age-related from cohort-related differences. Results regarding the familiarity ratings of older adults would also be consistent with the idea that earlier cohorts were socialized to use proverbs more than current cohorts were. Although we cannot rule out cohort differences, according to Gibbs and Beitel (1995) and Mieder (1993), proverbs are still of undiminished popularity, and we made an effort to familiarize all participants with the proverbs before the critical measures of the experiment.

A third concern involves the possible impact of sample selectivity regarding educational level. The samples studied are positively selected in this regard. It is possible that the proverb-related knowledge is contingent on a certain level of education. Within the samples, however, education-related cognitive skills, such as verbal ability differences, did not turn out to be relevant. Controlling for verbal ability did not change the pattern of outcomes.

We submit that this study has shown that proverbs are not only a tool for investigating cultural knowledge and individual preferences in the field of the pragmatics of life management, but are also a medium in which such preferences are captured. We were able to identify proverbs that could be linked in content to the central processes of life span regulation proposed by the SOC model (P. B. Baltes & Baltes, 1990; Freund & Baltes, 2000). More importantly, on an individual level of assessment, young and older adults favored and responded faster to proverbs reflecting selection, optimization, and compensation than to alternative control proverbs when asked to match proverbs to situational stems that cued decision making and life planning or asked for general advice. This preference, however, did not exist when participants were asked to focus on short-term goals such as relaxation. In our view, the pattern of findings can be viewed as indicating that laypeople judge the adaptiveness of life-management processes in a way that is consistent with the SOC model.

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Appendix

1. This study profited much from a diploma thesis by Gudula Ostrop supervised by Paul B. Baltes and Alexandra M. Freund (Ostrop, 1996). In that thesis, conducted as part of a student assistantship on the project, proverbs reflecting strategies of life management were identified and rated on 12 dimensions (e.g., familiarity, clarity, imagery), and the procedure for the matching task was evaluated. We express our appreciation for this important pilot work.

2. The mean number of words for each of the categories of proverbs was for selection: targets = 6.0, alternatives = 7.3; for optimization: targets = 6.7, alternatives = 6.7; for compensation: targets = 9.6, alternatives = 8.4. Thus, if a lower number of words contained in a proverb played a role in choice of proverb and response time, we would expect that in the case of selection, targets would be chosen more often and more quickly than alternatives. The opposite pattern would be expected for compensation. As can be seen in Figures 1 and 2, this pattern of results was not found.

3. On a correlational level, verbal ability was unrelated to both reaction times and choice of proverbs (all ps > .13).

4. Participants had been listening to one of two scenarios that was read to them. The scenarios both started with the request to imagine waiting for a doctor’s appointment to learn about the results of a blood test. Scenario 1 then went on describing that the doctors had found a very rare condition prolonging life expectancy significantly and ensuring very good health until death. Scenario 2, on the other hand, described that the doctors had found a very rare condition decreasing life expectancy drastically, leading to very bad functional health. During debriefing, many participants told us that they found the scenario too far-fetched to be able to imagine being in such a situation. To counteract possible negative mood effects induced by the second scenario, we closed the session with the open-ended question “Tell us about the best things in your life,” which focuses participants’ attention to positive aspects of their lives.

5. Twenty-four participants were excluded from this analysis because they had produced at least one empty cell out of the six cells of the 3 (process) × 2 (target vs. alternative) design.

6. We believe it to be unlikely that reading time differences between younger and older adults might have affected the results of our studies because of two reasons. First, as Stine (1990) showed, younger and older adults do not differ in overall reading time across a number of different types of sentences. Second, even though older adults typically show declines in processing complex syntactic forms (e.g., Kemper, 1987), the familiarity of the proverbs should probably counteract these effects. Recall that participants were familiarized with the proverbs before the experimental trials began.