Older and Younger Adults’ Strategy Use and Execution in Currency Conversion Tasks: Insights From French Franc to Euro and Euro to French Franc Conversions

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Younger and older adults were taught new strategies for converting amounts presented in French francs into euros or amounts presented in euros into French francs. The choice/no-choice method was used to obtain information on how often each newly learned strategy was used as well as information on the speed and accuracy of strategies. The results showed that both younger and older participants used the new conversion strategies unequally often and had strategy preferences that were justified by the relative ease of execution of each strategy. We discuss numerous practical applications of the present findings, as they suggest that one can help younger and older people by teaching them the add-half and divide-three strategies for the French-franc–euro conversions, that no specific strategies should be taught to older people, and that newly taught strategies are more efficient than those people use spontaneously.

Suppose you are on vacation in France for the first time and are about to buy your first real French baguette. The baker tells you that it costs 4 francs and 35 centimes. How much is that in U.S. or Canadian dollars? How can you find out? You can (a) use your calculator and do the conversion, knowing that U.S. $1 is 7.11 French francs (FF), (b) choose not to do the conversion, or (c) do the conversion in your mind by using a variety of strategies, such as doing the exact conversion (i.e., mentally dividing 4.35 by 7.11 = .59). Still, you may prefer to mentally do an approximate conversion after realizing that the price of a French baguette in France is roughly 1/2 of U.S. $1, which is U.S. $ .66. This article reports a study on currency conversion strategies. More specifically, it compares how younger and older French people use strategies to accomplish FF–euro (EUR) and EUR–FF conversions. The strategies that we have investigated were preexperimentally unknown to participants and enabled them to obtain approximate (but close to the exact) amounts in one currency from the other. The present study documents which of the newly learned strategies is favored by younger and older adults and strategy characteristics that justify participants’ preferences. This study also illustrates the usefulness of the choice/no-choice method in obtaining objective measures for comparing strategy efficacy in a wide variety of daily-life situations and more laboratory-oriented cognitive tasks in people of different ages and levels of cognitive status.

There were several motivations for the present study. First, conversion tasks are accomplished by many people who travel abroad and manage expenses in foreign currencies. Moreover, by January 1, 2002, 12 European countries will have switched to the euro, which will become the standard currency. This will pose a number of daily-life problems, one of which concerns people’s skill for doing conversion tasks and knowing how much items cost, compared with the availability of reference prices in the previous currency. The present study helps to establish how people can be aided in conversions by determining which strategies are best for doing these conversions and by determining how easy it is for younger and older adults to learn and use them. Second, there have been no studies carried out on currency conversion tasks. The only exception, to our knowledge, is a study by Lemaire, Lecacheur, and Ferrerol-Barbey (2001) that showed that people use several strategies to do conversion tasks and that these strategies differ in speed and accuracy. However, given the design that Lemaire et al. used, it was impossible to disentangle strategy use and strategy execution. This means that we know almost nothing regarding relative strategy effectiveness (i.e., speed and accuracy) in currency conversion tasks. More generally, the cognitive processes involved in currency conversion tasks are thus far largely unknown. Third, conversion tasks involve complex calculations relative to what is generally investigated in cognitive arithmetic (see Dehaene, 1997; Geary, 1994, for overviews). Very few studies have investigated complex arithmetic situations involving several arithmetic operations, and whole as well as decimal number manipulations. Such manipulations correspond to what people do in a variety of situations in their daily life (e.g., calculating tips or other percentages, comparing prices in different currencies, estimating the amount of money to be spent on grocery shopping). Conversion tasks enable the investigation of cognitive processes in complex calculation settings. Fourth, methodological and conceptual tools developed by cognitive psychologists may facilitate the investigation of people’s use of strategies in conversion tasks. Tools such as the choice/no-choice method or the concept of “strategy” are used in the present study. Finally, determining how younger
and older adults choose among available, newly learned strategies may shed light on fundamental issues in cognitive aging, such as how older people are able to learn and use different strategies to accomplish cognitive tasks, the question of whether younger and older adults have similar strategic preferences in cognitive tasks, and the issue of whether younger and older adults' strategy characteristics (e.g., speed and accuracy) are comparable. Investigating age-related differences and similarities in real world problem-solving situations proved useful in past research to qualify findings from laboratory problem-solving situations. For example, Denney and colleagues (Denney & Pearce, 1989; Denney, Pearce, & Palmer, 1982) found that age-related differences decreased in problem solving when older people solved familiar problems that were relevant to their life. Conversion problem solving is going to be important for younger and older adults' daily life after the euro becomes the standard currency of 12 European countries. The present research was conducted to contribute to our knowledge about age-related differences and similarities in real-world tasks such as currency conversion. We briefly review previous findings first on strategic aspects of human cognition and, second, on effects of age and problem type on those strategic aspects. We then provide a brief overview of the present study.

Strategic Aspects of Human Cognition

One of the most important features of human cognition is that people know and use multiple strategies to accomplish most cognitive tasks. A strategy is defined as a "procedure or set of procedures to achieve a higher goal" (Lemaire & Reder, 1999, p. 365). Multiple strategy use has been demonstrated in a wide variety of domains, including arithmetic, serial recall, question-answering, sentence verification, reading, and naive physics (e.g., Aaronson & Ferres, 1986; Collins, 1978; Glucksberg & McCloskey, 1981; Hasher & Zacks, 1979; LeFevre, Bisanz, Daley, Buffone, & Sadesky, 1996; LeFevre, Sadesky, & Bisanz, 1996; Lemaire & Siegler, 1995; Lovett & Schunn, 1999; Mandler, 1980; Reder, 1987; Reder & Ritter, 1992; Siegler & Lemaire, 1997; Smith, Shoben, & Rips, 1973). Within arithmetic, the domain of the present study, empirical research has established that different strategies are selected by the same participant on different problems as well as on the same problem solved on different occasions (Campbell & Xue, 2001; Geary, Frensch, & Wiley, 1993; Geary & Wiley, 1991; LeFevre, Bisanz, Daley, Buffone, & Sadesky, 1996; LeFevre, Sadesky, & Bisanz, 1996; Lemaire & Fayol, 1995; Lemaire & Reder, 1999; Lemaire & Siegler, 1995; Masse & Lemaire, 2001; Pelham, Sumarta, & Myaskovsky, 1994; Reder & Ritter, 1992; Siegler, 1988; Siegler & Lemaire, 1997; Siegler & Shrager, 1984).

Researchers have made a distinction between at least two dimensions of cognitive strategies: strategy use and strategy execution (e.g., Dunlosky & Hertzog, 1998, 2001; Lemaire & Siegler, 1995: Salthouse, 1991). Strategy use, sometimes also called strategy production, refers to both the type of strategies people use spontaneously to accomplish cognitive tasks and to the distribution of strategies (i.e., relative percentages overall and across different categories of problems). Strategy execution, sometimes also called strategy performance, refers to how quickly and accurately a problem is solved with a given strategy. In the present article, we investigate both strategy use and strategy execution in conversion tasks. First, new strategies were taught to participants. Then, data on how each strategy was used and executed documents which strategy was preferred and whether participants used a given strategy when it enabled them to be faster, more accurate, or both.

Effects of Age and Problem Type on Strategy Use and Execution

Both younger and older adults engage in multiple strategy use, although younger and older adults have been found to differ on either strategy use or strategy execution, or both (see Chasseigne, Grau, Mullet, & Cama, 1999; Chasseigne, Mullet, & Stewart, 1997; Dunlosky & Hertzog, 1998, 2001; Siegler & Lemaire, 1997). For example, Geary et al. (1993) investigated younger and older adults' strategies in complex subtraction problem solving (e.g., 37 - 9). They found that older adults used columnar retrieval strategy (i.e., retrieving basic facts from long-term memory [LTM] in a columnwise fashion, such as when they solved 95 - 8 by retrieving 15 - 8) more frequently than younger adults (93% vs. 67%), whereas older adults used decomposition (i.e., breaking down the subtrahend into two smaller numbers and then successively subtracting these from the minuend, such as when they solved 32 - 3 by calculating 3 = 2 + 1; 32 - 2 = 30; and 30 - 1 = 29) less often (8% vs. 18%). Similarly, researchers have found that younger and older adults differ in strategy speed and accuracy. In the present study, we investigated younger and older adults' conversion strategy use and execution. More specifically, we compared younger and older adults' differences in mean percentage use of a predefined set of newly learned strategies and of each strategy speed and accuracy.

Strategy use and execution are influenced by problem type. In the domain of arithmetic, one of the most robust findings is called the problem-size effect (Ashcraft, 1995; Ashcraft & Battaglia, 1978; Geary et al., 1993; LeFevre, Bisanz et al., 1996; LeFevre, Sadesky et al., 1996; Zbrodoff, 1995). In this effect, when people have to find the solution to arithmetic problems (e.g., 8 × 7 = ?; 43 + 75 = ?), problems involving large numbers (e.g., 8 × 7; 49 + 57) are solved more slowly and less accurately than problems involving small numbers (e.g., 3 × 4; 24 + 32). Although this effect has been shown with both simple (e.g., 6 × 4) and complex arithmetic (e.g., 37 + 54), it has not yet been investigated in conversion tasks. In the present experiments, we compared conversion strategy use and strategy execution on small (e.g., FF 28) and large (e.g., FF 78) to-be-converted numbers.

Overview of the Present Experiments

In the present experiments, younger and older adults were asked to say how much an amount given in FF was in euros or how much an amount given in euros was in FF. First, four new strategies, two for each conversion task, were taught to younger and older adults. Then, each participant was tested in two conditions. In the first condition, the choice condition, participants could choose between the strategy when it enabled them to be faster, more accurate, or both. The choice/no-choice method was devised and used by Siegler and Lemaire (1997) to investigate people's use of a calculator versus their use of mental calculation. The use of the choice/no-
choice method in currency conversion tasks was expected to extend the generality of its features, which makes it appropriate for understanding which of the new strategies people will use and why. The two most relevant features for the purpose of the present article are the following: First, participants’ strategy preferences are investigated in the choice condition. Mean percentage of use of each strategy in the choice condition indicates participants’ strategy preference. As participants start with the choice condition, their choices are not influenced by the recent use of either strategy. Second, strategy speed and accuracy in no-choice conditions are unbiased estimates of characteristics of strategy execution, as they are uncontaminated by participants’ strategy choices. This makes it possible to examine whether participants prefer a given strategy because of its relative benefits. That is, participants may prefer one strategy over the other because it is easier to execute, which would be seen in this strategy as greater speed and accuracy. Comparisons of younger and older adults’ strategy execution, and the role of this execution on strategy use, are possible without running the risk of confounding strategy use, strategy execution, and the interactions of these two aspects with people’s age.

We investigated four issues. First, do people have preferences among newly acquired currency conversion strategies? If yes, are these preferences justified by strategy execution (i.e., speed, accuracy) characteristics? Second, are strategy use and execution influenced by people’s age (i.e., younger vs. older adults) and problem type (i.e., small vs. large numbers)? Participants’ strategy preferences should be reflected in higher percentages of their use in choice conditions. This may be accompanied by greater speed and accuracy in no-choice conditions for the preferred strategy. Third, effects of problem features would be reflected in different percentage of use of each strategy, with the hardest strategy being used more frequently on small numbers than on large numbers, and in greater speed and accuracy on small problems than on large problems. Fourth, differences in younger and older adults’ strategy use and execution predicts different strategy preferences in each age group, and greater speed and accuracy in younger adults.

Method

Participants

The participants were 96 individuals (48 younger and 48 older adults, half of whom were women). Forty-eight individuals participated in the FF–EUR conversion task and 48 in the EUR–FF conversion task. Participants were randomly assigned to a conversion task. Younger adults had a mean age of 18.9 years (range = 17 years, 1 month–20 years, 3 months); they were undergraduate students at the University of Provence in Aix-en-Provence, France, and participated in the experiments in partial fulfillment of a course requirement. Older adults had a mean age of 67.9 years (range = 62 years, 2 months–75 years, 3 months); they were volunteers who attended courses given at the University of Provence in Aix-en-Provence, France for senior citizens. To thank older adults for their participation, they were offered a coupon for a course requirement. Older participants were matched on the basis of their number of years of formal education (> 12 years; I < 1.5). In order to detect potential individuals at risk of Alzheimer’s disease, older participants took the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975). All participants scored higher than 27 (M = 29.2); therefore, no one was excluded from the study. Before the beginning of the experiment, younger and older participants took a French version of the Mill Hill Vocabulary Scale (MHVS; Deloair, 1993; Raven, Court, & Raven, 1986). The results showed no difference between younger and older adults’ scores (24 and 26, respectively, I < 1).

Stimuli

In each of the conversion tasks, the stimuli were 3 sets of 18 numbers each, for a total of 54 numbers. All numbers were two-digit numbers ranging from 11 to 99. Within each set, half the numbers were arbitrarily categorized as small and half as large, on the basis of the size of the numbers. For each conversion task, the three sets had equal-average number size.

Procedure

Each participant was tested in a single session. Before the experimental trials, participants were taught new strategies after it was ascertained that they did not know them preexperimentally. Then, they practiced each strategy with 10 problems. All participants had no difficulties with each newly learned strategy at the end of these practice trials. The two strategies for the FF–EUR conversion task are called the add-half and multiply-three strategies; the two strategies for the EUR–FF conversion task are called the divide-three and multiply-six strategies.

The add-half and multiply-three strategies for the FF–EUR conversion task were explained to participants as follows:

Add-half: Divide the price in FF by 2, add the quotient to the price in FF, and divide this sum by 10. For example, if you have to convert FF 120, you calculate (a) 120/2 = 60; (b) 60 + 60 = 180; (c) 180/10 = € 18.

Multiply-three: Multiply the price in FF by 3, divide the product by 2, and divide the quotient by 10. For example, if you have to convert FF 120, you calculate (a) 120 X 3 = 360; (b) 360/2 = 180; (c) 180/10 = € 18.

The divide-three and multiply-six strategies for the EUR–FF conversion task were explained as follows:

Divide-three: Divide the price in euros by 3, multiply the quotient by 2, and multiply the resulting product by 10. For example, if you have to convert € 120, you calculate (a) 120/3 = 40; (b) 40 X 2 = 80; (c) 80 X 10 = FF 800.

Multiply-six: Multiply the price in euros by 6 and add 10% to the product. For example, if you have to convert € 50, you calculate (a) 50 X 6 = 300; (b) 300/10 = 30; (c) 300 + 30 = FF 330.

The experimental numbers were presented using 48-point Times New Roman font in the center of a 14-in. (36 cm) computer screen controlled by a Power Macintosh. At the outset of each trial, the word ready (prêt in French) appeared at the center of the screen for 500 ms. Then, the number was displayed at the center of the screen. Numbers remained on the screen until the participant responded. The timing of each trial began when the number appeared on the screen and ended when the experimenter pressed the space bar, the latter event occurring soon after the participant’s response. We used PsyScope software, which collected data with 16-ms accuracy. However, for the purposes of this experiment, times were coded to the nearest 0.1 s. On each trial, the experimenter typed the participant’s answer into the computer; in the choice condition, the experimenter also typed in a code for the participant’s strategy. In both conversion tasks, participants exhibited overt behaviors while completing conversion tasks on 98% of trials. For example, participants who used the add-half strategy on FF 42 calculated out loud: 42/2 = 21; 21 + 21 = 63; 63/10 = 6.3. These overt behaviors were noted by the experimenter on a trial-by-trial basis. Moreover, immediately after each conversion in the choice condition, participants were asked which of the two available strategies they used. There were no disagreements between experimenter’s notes of which
strategy was used and participants' indication of which of the two strategies they used.

In the choice condition of the FF–EUR conversion task, participants could use either the add-half or the multiply-three strategy. In one no-choice condition, participants were required to use the add-half strategy (i.e., add-half the price and divide by 10) on all problems. In the other no-choice condition, participants were required to use the multiply-three strategy (i.e., multiply by 3, divide by 2, divide by 10) on all problems. Similarly, in the choice condition of the EUR–FF conversion task, participants could use either the divide-three or the multiply-six strategy. In one no-choice condition, participants were required to use the divide-three strategy (i.e., divide by 3, multiply by 2, multiply by 10) on all problems. In the other no-choice condition, participants were required to use the multiply-six strategy (i.e., multiply by 6 and add 10%) on all problems. In each conversion task, half the participants saw the following order: choice; no-choice condition 1; no-choice condition 2. The other half saw the choice/no-choice 2/no-choice 1 order. The choice conditions were given in the choice condition, each strategy was required on all problems. Performance in this condition yielded estimates of strategy speed and accuracy that were not biased by recency effects. That is, after converting a series of numbers with one strategy, participants might have been biased toward using that strategy in a subsequent choice condition, only because the recent use of that strategy makes it more available. Moreover, in each age group, each subset of numbers was seen by 8 participants under each of the three conditions in each conversion task. The subsets of problems were equivalent in the speed and accuracy they elicited in the no-choice conditions and in the percentage of strategy use they elicited in the choice condition for each of the conversion tasks ($F$s < 1).

Results and Discussion: FF–EUR

In both conversion tasks, results are reported in two main parts. The first part examines strategy execution (i.e., speed and accuracy), and the second part examines strategy use. Initial analyses indicated that there were no order effects either between conditions or within them. Participants who performed the conditions in the two orders (choice/no-choice-1/no-choice-2 vs. choice/no-choice-2/no-choice-1) did not differ in speed or accuracy in any of the two currency conversion tasks. Therefore, the data were grouped across orders in further analyses. Percentages of use of each strategy, speed, and accuracy for the FF–EUR conversion task are presented in Table 1 for each number-size condition.

Strategy Execution

We analyzed mean solution latencies and percentage of deviation in each choice and no-choice condition with analyses of variance (ANOVA) by using a 2 (age: younger, older adults) × 2 (strategy: add half, multiply three) × 2 (number size: small, large) design, with age as the only between-subjects factor. One ANOVA was used with participants ($F_{P}$), and one was used with numbers ($F_{N}$) as random factors so as to control for potential item-specific effects. Summaries of significant and marginally significant effects are presented in Table 2.

Strategy speed. Analysis of choice-condition speed showed that the add-half strategy was almost 2.0 s faster than the multiply-three strategy. As seen in Table 1, the Age × Strategy interaction was significant, showing that younger adults performed 3.2 s faster with add-half than with multiply-three (compared with 0.5 s in older adults). Moreover, solution times were 3.2 s shorter with small numbers compared with large numbers. However, these effects in the choice condition should be interpreted with caution because strategy speed and accuracy in choice conditions result from both strategy choices and strategy execution characteristics. The no-choice condition provides an unbiased measure of strategy speed and accuracy.

In the no-choice condition, strategy was required on all problems. Performance in this condition yielded estimates of strategy speed and accuracy that were not biased by selective use of the strategies for different problems and by different participants. Younger adults were faster than older adults (10.5 s vs. 14.6 s). Moreover, participants were faster when they used the add-half strategy (11.1 s) than when they used the multiply-three strategy.

Table 1

<table>
<thead>
<tr>
<th>Number size</th>
<th>Percentage of use of add-half</th>
<th>Solution time (in seconds)</th>
<th>Percentage of deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Younger</td>
<td>Older</td>
<td>Younger</td>
</tr>
<tr>
<td>Small</td>
<td>73</td>
<td>61</td>
<td>9.8</td>
</tr>
<tr>
<td>Large</td>
<td>57</td>
<td>58</td>
<td>11.6</td>
</tr>
<tr>
<td>Means</td>
<td>65</td>
<td>60</td>
<td>10.6</td>
</tr>
</tbody>
</table>

Note. In the choice condition, the means are not simple averages of the means for the two types of problems. They reflect the different frequencies of use of the strategies on each type of problem by each age group.

1 As in previous studies of strategies in cognitive tasks (e.g., Lemaire & Siegler, 1995; Siegler, 1988), only participants using a relevant strategy at least three times (participants-based analyses) and items on which the relevant strategies were used by at least three participants (items-based analyses) are included in the statistical analyses. At least this many observations are needed to obtain stable estimates of mean speed and accuracy in each condition and on each problem.
than with small numbers (8.5% vs. 12.1%), especially in older adults (9.3% vs. 10.5%). Moreover, deviation was smaller with large numbers than with small numbers (8.5% vs. 12.10%), especially in older adults (large–small differences were 6.1% and 1.1% in younger and older adults, respectively).

In no-choice conditions, younger adults provided estimates that were closer to correct answers than older adults (6.6% vs. 10.5%). Moreover, the add-half strategy yielded answers that were closer to correct answers than the multiply-three strategy; this strategy difference was observed in younger adults (5.4% vs. 7.9%) but not in older adults (10.8% vs. 10.5%).

The last significant effects in the no-choice condition were those of number size and of Age X Number Size, showing that answers to large numbers (10.6% vs. 6.6%), especially in older adults (large–small differences were 6.5% and 1.5% in older and younger adults, respectively). This effect of number size on accuracy in the present experiment was somewhat inconsistent with those usually reported in the arithmetic literature (see Ashcraft, 1995, for a recent review of this effect). Indeed, contrary to what is typically observed, small numbers yielded poorer accuracy than large numbers. Note however, that accuracy had to be assessed here by using percentage of deviations. A mistake of € 1 for € 2 (6.7% vs. 50% deviations), independent of how difficult conversions are. Therefore, it is not possible to conclude from the present data that currency-conversion task accuracy is an exception with regard to problem-size effect usually reported in cognitive arithmetic.

Conclusions about strategy execution. There were two sets of interesting findings regarding strategy execution; one set consisted of relative difficulty and age-related similarities, and the other set consisted of differences in strategy execution.

One of the most important findings that came out of strategy speed and accuracy analyses was that one strategy was easier than another strategy. This large–small difference was greater in older adults (10.8% vs. 10.5%).

In the choice condition, younger adults provided responses that were closer to correct answers than did older adults (9.3% vs. 10.5%). Moreover, deviation was smaller with large numbers than with small numbers (8.5% vs. 12.1), especially in older adults (large–small differences were 6.1% and 1.1% in younger and older adults, respectively).

Table 2

<table>
<thead>
<tr>
<th>Effect</th>
<th>Participant-based analyses (F₁)</th>
<th>Number-based analyses (F₂)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>df</td>
<td>MSE</td>
</tr>
<tr>
<td>Age X Number Size</td>
<td>1, 23</td>
<td>74.92</td>
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<tr>
<td>Age X Strategy</td>
<td>1, 23</td>
<td>6.19</td>
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<tr>
<td>Number size</td>
<td>1, 23</td>
<td>13.41</td>
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<tr>
<td>Age</td>
<td>1, 23</td>
<td>6.19</td>
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Strategy speed in choice condition

<table>
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<tr>
<th>Effect</th>
<th>df</th>
<th>MSE</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age X Number Size</td>
<td>1, 46</td>
<td>86.04</td>
<td>9.03*</td>
</tr>
<tr>
<td>Age X Strategy</td>
<td>1, 46</td>
<td>11.22</td>
<td>36.00*</td>
</tr>
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<td>Number size</td>
<td>1, 46</td>
<td>7.25</td>
<td>6.27*</td>
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Strategy speed in no-choice condition

<table>
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<th>df</th>
<th>MSE</th>
<th>F</th>
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<tr>
<td>Age X Number Size</td>
<td>1, 18</td>
<td>194.70</td>
<td>0.17</td>
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<tr>
<td>Age X Strategy</td>
<td>1, 18</td>
<td>19.51</td>
<td>13.36*</td>
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<td>Strategy</td>
<td>1, 46</td>
<td>20.78</td>
<td>1.35</td>
</tr>
<tr>
<td>Age X Number Size</td>
<td>1, 46</td>
<td>19.51</td>
<td>6.66*</td>
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Strategy accuracy in choice condition

<table>
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<th>MSE</th>
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<tbody>
<tr>
<td>Age X Number Size</td>
<td>1, 46</td>
<td>78.04</td>
<td>9.66*</td>
</tr>
<tr>
<td>Age X Number Size</td>
<td>1, 46</td>
<td>9.18</td>
<td>83.45*</td>
</tr>
<tr>
<td>Age X Strategy</td>
<td>1, 46</td>
<td>9.18</td>
<td>3.57†</td>
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Strategy accuracy in no-choice condition

<table>
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<th>Effect</th>
<th>df</th>
<th>MSE</th>
<th>F</th>
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<tbody>
<tr>
<td>Age X Number Size</td>
<td>1, 46</td>
<td>24.86</td>
<td>3.56*</td>
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</table>

†p < .10 (marginally significant). *p < .05.
the other: Add-half yielded greater levels of speed and accuracy. The choice/no-choice design enables such a conclusion, as no-choice strategy speed and accuracy were not contaminated by (participant and item) selection artifacts; speed and accuracy were unbiased measures of strategy execution. Such strategy speed and accuracy differences most likely capture how relatively difficult it was to execute each strategy.

The different levels of difficulty of add-half and multiply-three strategy execution might stem from two sources: arithmetic operations and the numbers involved in these operations. Regarding arithmetic operations, there are two differences between add-half and multiply-three strategies. One difference concerns the type of unique arithmetic operations (i.e., addition in add-half vs. multiplication in multiply-three) and the other difference concerns the order of operations (i.e., two division operations intermixed with an addition operation in add-half vs. two subsequent division operations, followed by multiplication in multiply-three). Arithmetic operations are known to be of different levels of difficulty in adults and to yield different levels of speed and accuracy (e.g., Campbell, 1997; Campbell & Xue, 2001; LeFevre & Morris, 1999; Lemaire, Abdi, & Fayol, 1996; Lemaire, Barrett, Fayol, & Abdi, 1994; Lemaire, Fayol, & Abdi, 1991; Miller, Perlmutter, & Keating, 1984; Rickard, Healy, & Bourne, 1994). Hence, part of the differences between the two conversion strategies tested here stems at least from the nature of arithmetic operations involved.

Another contributing factor to the differential difficulty of currency conversion strategies concerns the size of the operands that have to be processed within each strategy. For example, add-half involves operating with 2, or adding half of to-be-converted numbers, whereas multiply-three involves operating with 3, or dividing a number that is three times as large as to-be-converted numbers. Operating with large numbers is known to take more time and to be more error prone than operating with small numbers (e.g., Campbell, 1997, 1999; Campbell & Xue, 2001; LeFevre & Morris, 1999). The effects of number size on speed in the present experiment are consistent with this traditional arithmetic problem-size effect. In sum, the order and nature of arithmetic operations, together with the size of operands, contribute to add-half being a faster and more accurate strategy and to its frequent use by participants.

The final interesting set of results is the age-related similarities and differences in strategy execution. On the similarity side, both younger and older adults were faster at executing the add-half strategy than the multiply-three strategy (as indicated by the lack of Age × Strategy effects).

There were important differences between younger and older adults' strategy execution. The fact that older adults had lower levels of strategy speed and accuracy than younger adults ruled out potential speed–accuracy trade-offs that would compromise interpretation of speed performance. It is difficult to make strong inferences from older adults' lower accuracy, despite corresponding lower speed. Indeed, younger adults might have obtained better accuracy because they accomplished the task with the goal of being as accurate as possible. Older adults might have adopted a less stringent accuracy criterion. Lower speed in older adults is consistent with the pervasive findings of cognitive slowing in literature on aging, and Age × Number Size as well as Age × Strategy interactions replicated widely reported Age × Complexity effects. In most cognitive tasks, older adults are slower than younger adults, and even slower on the most demanding cognitive tasks (see Salthouse, 1996, for a review). Here, older participants most likely needed more time to trigger and execute each arithmetic operation within each strategy, and even more time for large numbers than for small numbers, and with the hardest strategy (i.e., multiply-three) than for the easiest (i.e., add-half).

### Strategy Use

Both younger and older participants used the add-half strategy more often than the multiply-three strategy (62% vs. 38%), and add-half was used more frequently with small numbers than with large numbers (67% vs. 58%). The difference in add-half use with large numbers versus small numbers was larger in younger adults (73% vs. 57%) than in older adults (61% vs. 58%). The ANOVAs on mean percentage of use of the add-half strategy involving a 2 (younger, older adults) × 2 (small, large numbers) design, with repeated measures on the number-size factor, revealed an effect of number size that was significant in a participant-based analysis and marginally significant in a number-based analysis, $F_{(1, 46)} = 7.08, p < .05; M S E = 293.54; F_{(1, 106)} = 2.89, p = .09; M S E = 470.27$; as well as a Strategy × Number Size interaction that was significant with participants, $F_{(1, 46)} = 3.60, p < .05; M S E = 293.54$; but not with numbers, $F_{(1, 106)} = 1.4, M S E = 470.27$, as random factors.

In sum, individuals' most favorite strategy for FF–EUR conversion tasks was add-half. Both younger and older adults used it more often than the multiply-three strategy, with small and large numbers. This is an interesting finding, because both strategies involve three arithmetic operations, two divisions and one addition for the add-half strategy and two divisions and one multiplication for the multiply-three strategy. This suggests that preferences in strategy use for the FF–EUR conversion task is not the result of the number of arithmetic operations.

Strategy use in this experiment is easily understood when strategy execution is taken into account. Add-half was the most preferred strategy, and it was also the quickest and most accurate in the no-choice condition. Participants were over 20% faster and 12% more accurate when they were required to use add-half than when they were required to use multiply-three. Thus, when doing conversions participants most often used the strategy with which they were faster and most accurate. As speed and accuracy measures of strategy execution in the no-choice condition indicated, add-half was easier than multiply-three for individuals to execute and, consequently, was used more often.

Although both age groups used the add-half strategy more often because it was easier to execute, younger adults used it more often than older adults on small numbers (but equally often on large numbers). Two factors might have led younger adults to use add-half much more frequently on small numbers than on large numbers: Half of small numbers (e.g., 28/2 = 14) might prove easier to find than half of large numbers (e.g., 92/2 = 46), possibly because participants know and retrieve directly from LTM many small-tie combinations such as 12 + 12 or 14 + 14, and few large combinations such as 46 + 46 or 39 + 39. First, consistent with this finding, note that small numbers were converted faster by using add-half than by using multiply-three in younger adults (27%) than in older adults (18%). Second, multiply-three requires individuals to manage more carry-over operations on large problems than on small problems. And younger adults have been found to have more difficulty with carry-over operations than older
adults (e.g., Geary, Frensch, & Wiley, 1993; Geary & Lin, 1998; Geary, Salthouse, Chen, & Fan, 1996). By choosing the add-half strategy on almost three quarters of small problems, younger participants might have deliberately pursued the goals of easily finding tie combinations in LTM and avoiding carry-over operations.

Results and Discussion: EUR–FF

Strategy characteristics (i.e., mean percentage of use of divide-three, solution latencies, and mean percentage of deviation) are shown in Table 3. For each strategy characteristic, the same ANOVAs used in the FF–EUR conversion task were carried out in the EUR–FF conversion task.

Strategy Execution

Strategy speed. Choice-condition speed analyses revealed that younger adults completed the conversion task 4 s faster than older adults, and that the divide-three strategy was completed 4.3 s faster than the multiply-six strategy. Participants tended to be faster with small numbers than with large numbers (14.0 s vs. 15.8 s), although number size was significant with participants only as a random factor (see Table 4 for the ANOVA summaries).

As in the FF–EUR conversion task, no-choice conditions provided estimates of strategy speed that were not contaminated by strategy choices and, hence, were appropriate to evaluate relative strategy speeds. Younger adults were somewhat faster than older adults (13.4 s vs. 14.5 s), and divide-three was faster than multiply-six. Finally, participants were faster when converting small numbers than when converting large numbers (12.4 s vs. 14.8 s).

Strategy accuracy. There were no significant effects in the choice condition, either in participant- or number-based analyses (F < 1), except for the main effect of strategy that was significant only when numbers were entered as a random factor, and which showed that multiply-six tended to be slightly more accurate than divide-three (5.9% vs. 6.6%). In the no-choice conditions, we observed higher levels of accuracy for large numbers than for small numbers, particularly in younger adults (for reasons similar to those discussed in the FF–EUR conversion performance analyses).

Conclusions about strategy execution. As with FF–EUR conversion strategies, execution of EUR–FF conversion strategies differed. Divide-three was the fastest strategy, although it was not more accurate than the multiply-six strategy. Once again, differences in strategy speed cannot be accounted for by the number of arithmetic operations (which were the same for each strategy). Most likely at stake are the type of arithmetic operations and the size of operands involved. Divide-three required participants to perform division followed by two multiplication operations, whereas multiply-six successively involved a multiplication, a division, and an addition operation. Moreover, the divide-three required individuals to first operate with 3 as an operand, then with 2 and 10, whereas the multiply-six strategy required mental manipulation first of 6, then of 10. Although it hasn’t yet been reported in the literature whether the order of arithmetic operation has an effect, the two strategies differed at least in the size of the operands that participants manipulated by using the arithmetic operation required by each strategy. For example, the second arithmetic operation required performance on much larger numbers for multiply-six (i.e., the product of six and the to-be-converted numbers) than for divide-three (i.e., the result of the to-be-converted numbers divided by 3). As previously noted, mental arithmetic is known to take more time with large numbers than with small numbers.

An interesting parallel between the EUR–FF conversion task and the FF–EUR conversion task was that strategy speed was affected by number size. Whichever strategy participants used, they were faster at converting small numbers than large numbers. This confirms and generalizes the number-size effect to complex arithmetic tasks (see Ashcraft, 1995; Campbell & Xue, 2001; Geary, 1996; LeFevre, Bisanz, et al., 1996; Zbrodoff, 1995, for recent discussions of this effect).

Finally, with regard to aging effects, younger participants were faster than older participants. As in the FF–EUR conversion task, this is most likely a cognitive slowing effect, according to which, as people age, their cognitive processes are slower to trigger and

Table 3
Younger and Older Adults’ Mean Percentages of Use of Add-Half Strategy, Mean Solution Times (in Seconds), and Percentage of Deviation in Choice and No-Choice Conditions in the EUR–FF Conversion Task

<table>
<thead>
<tr>
<th>Number size</th>
<th>Percentage of use of divide-three</th>
<th>Solution time (in seconds)</th>
<th>Percentage of deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Younger</td>
<td>Older</td>
<td>Mean</td>
</tr>
<tr>
<td>Small</td>
<td>56</td>
<td>51</td>
<td>10.5</td>
</tr>
<tr>
<td>Large</td>
<td>59</td>
<td>54</td>
<td>14.9</td>
</tr>
<tr>
<td>Means</td>
<td>58</td>
<td>53</td>
<td>12.7</td>
</tr>
<tr>
<td>Choice condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>100</td>
<td>100</td>
<td>11.2</td>
</tr>
<tr>
<td>Large</td>
<td>100</td>
<td>100</td>
<td>14.9</td>
</tr>
<tr>
<td>Means</td>
<td>100</td>
<td>100</td>
<td>13.1</td>
</tr>
</tbody>
</table>

Note. As in the FF–EUR conversion task for the choice condition, the means are not simple averages of the means for the two types of problems. They reflect the different frequencies of use of the strategies on each type of problem by each age group.
execute. Here too, such a cognitive-slowing effect was not compromised by speed-accuracy trade-offs.

Strategy Use

As can be seen in Table 3, the divide-three strategy was used more often than the multiply-six strategy (55% vs. 45%). Divide-three was used equally often by younger and older adults (58% vs. 52%). The ANOVAs involving the 2 (age) × 2 (number size) interaction, with number size as a within-subjects factor, revealed no significant effects of age, number size, or their interaction (Fs < 1), even though participants tended to use divide-three slightly more often on large problems than on small problems.

In sum, participants had a preference between the two available strategies: They used divide-three most often. This was somewhat surprising. Indeed, we expected that participants would use the multiply-six strategy more often than the divide-three strategy because people are known to be more at ease with multiplication than with division (Campbell, 1997; Campbell & Xue, 2001; LeFevre & Morris, 1999), and because adding 10% does not appear as hard intuitively. Contrary to our expectations, participants did not prefer the multiply-six strategy. Participants used divide-three on about 55% of the trials. They chose the strategy they were faster at executing, suggesting that the divide-three strategy was cognitively easier than the multiply-three strategy (and, maybe, that adding 10% is not as easy). Note though, that in contrast to the FF–EUR conversion task, both EUR–FF conversion strategies were equally accurate, suggesting that relative speed contributed to participants' more frequent use of divide-three. Finally, there were no differences between younger and older adults regarding which strategy they used most: Divide-three was used more often than multiply-six in both age groups and equally so in the two groups.

Strategy Execution: Control Experiment

The goal of this experiment was to test the possibility that differences in strategy execution in both conversion tasks stemmed from no-choice conditions being tested after choice conditions. This is necessary to control for potential order effects on strategy use in choice conditions (i.e., using one strategy in no-choice conditions may bias strategy choices toward greater use of the strategy that has just been used on set of trials). However, a possible consequence of testing participants in choice conditions first is that differences in strategy speed in no-choice conditions may stem from differential practice and not from true differences between strategy latency and accuracy. Specifically, participants have used the add-half strategy more often than the multiply-three strategy (62% vs. 38%) in the choice condition of the FF–EUR conversion task; they used the divide-three strategy more often than the multiply-six strategy (55% vs. 45%) in the EUR–FF conversion task. This greater use of the add-half and multiply-six strategies may have helped participants to get more practice with those strategies, thereby enabling those strategies to be more efficiently executed in subsequent no-choice conditions. To control for this potential confound, we conducted an additional control experiment in which participants were only tested in the no-choice conditions.

Method

Participants

Twenty-four participants, 12 each in the FF–EUR and EUR–FF conversion tasks, volunteered for this experiment. All were young participants (mean age = 22.3; range = 18.9–24.4). Half the participants were women.

Material and Procedure

Material and procedure were similar to those used in previous experiments, with one exception. Participants were tested only under no-choice conditions. Only two subsets of problems were tested so that the number of amounts (N = 18) converted by each participant was the same in this no-choice condition as in the previous FF–EUR and EUR–FF conversion
tasks. In each conversion task, all participants solved the same subsets of 18 problems with each strategy. Half of participants first converted the 18 amounts with one strategy, with a 5-min break, and finally solved the 18 amounts with the other strategy. The strategy order was reversed for the other half of participants. Preliminary analyses revealed no order effects.

Results

For both conversion tasks, strategy execution was analyzed in the same way as in the no-choice conditions of the choice/no-choice experiment. Mean solution times and percentage of deviation are displayed in Table 5.

Strategy execution in the FF–EUR conversion task. Mean solution times and percentage of deviation were analyzed with 2 (strategy: add-half, multiply-three) × 2 (number size: small, large) within-subject ANOVAs. Significant effects of strategy, F(1, 11) = 6.08, p < .05, MSE = 681,275, and number size, F(1, 11) = 6.87, p < .05, MSE = 182,581.9, but no interaction, F(1, 11) = 1.13, ns, were observed in latency. The only significant accuracy effect was that of number size, F(1, 11) = 6.55, p < .05, MSE = .812. As can be seen in Table 5, the add-half strategy yielded faster performance, and smaller problems were solved faster than larger problems.

Strategy execution in the EUR–FF conversion task. Once again, latency and accuracy were analyzed with 2 (strategy: divide-three, multiply-six) × 2 (number size: small, large) within-subject ANOVAs. We observed significant effects of strategy, F(1, 11) = 5.72, p < .05, MSE = 347,552.9, and number size, F(1, 11) = 5.39, p < .05, MSE = 151,326.16, but no interaction (F < 1) in latency. The only significant accuracy effect was that of number size, F(1, 11) = 7.8, p < .05, MSE = 3.649. As can be seen in Table 5, the divide-three strategy proved faster than the multiply-six strategy, and small amounts were converted faster than large amounts.

Conclusion

This control experiment replicates differences in strategy execution in conversion tasks. In the FF–EUR conversion task, the add-half strategy yielded shorter solution times. In the EUR–FF conversion task, participants were faster when they used the divide-three strategy. This shows that differences in strategy execution observed in the previous no-choice conditions were not simply the consequences of differential practice in the chosen strategies.

General Discussion

The goal of the present study was to investigate younger and older adults' strategy use and execution in currency conversion tasks. Younger and older adults provided approximate conversions in the context of FF–EUR and EUR–FF conversion tasks. The choice and no-choice method used here enabled us to unambiguously and precisely determine younger and older adults' strategy characteristics (i.e., strategy use, speed, and accuracy). The results showed that participants favored one strategy in each conversion task; this strategy preference was justified by the relative ease with which participants executed the strategies. The present findings have implications for understanding (a) how people accomplish conversions from one monetary system to another and (b) aging effects in strategic aspects of cognitive performance. We discuss these implications as well as their practical applications.

Strategy Use and Execution in Currency Conversion Tasks

Only one study of currency conversion tasks had been conducted before this one (Lemaire et al., 2001). This previous study reported that younger individuals did not accomplish currency conversion tasks with a single strategy. They used a variety of strategies, and the strategies differed in speed and accuracy. This study used the choice method (i.e., asking individuals to do conversions with whatever strategy they wanted on each trial). The choice method has been widely used in a variety of cognitive domains and has been fruitful in identifying the set of strategies that people use spontaneously to accomplish cognitive tasks. However, the limits of the choice method preclude its use to determine if a strategy is faster and more accurate than another and if the strategy that people used most often is also the fastest one. For example, in the context of currency conversion strategies, Lemaire et al.'s (2001) study did not permit us to know whether two strategies differed in speed because of inherent speed differences or because the two strategies were used to convert different sets of amounts. The present study assessed strategy execution independent of strategy use and revealed several interesting findings.

The first interesting set of findings of the present study concerns strategy use. Participants did not choose one strategy before accomplishing the currency conversion task and did not use that preselected strategy on all trials. As can be seen in Table 6, in both conversion tasks, some participants used one preferable strategy, other participants favored an alternative strategy, and still other participants used each strategy approximately equally often. Moreover, some amounts were converted with one preferable strategy, other amounts were converted with the alternative strategy, and still other amounts were converted equally often with each strategy. Above and beyond this strategy diversity, one was

Table 5
Mean Solution Times (in Seconds) and Percentage of Deviation in FF–EUR and in EUR–FF Conversion Tasks

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Solution time (in Seconds)</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small numbers</td>
<td>Large numbers</td>
</tr>
<tr>
<td>FF–EUR conversion task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add-half</td>
<td>8.1</td>
<td>9.7</td>
</tr>
<tr>
<td>Multiply-six</td>
<td>9.9</td>
<td>11.9</td>
</tr>
<tr>
<td>EUR–FF conversion task</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divide-three</td>
<td>11.8</td>
<td>13.4</td>
</tr>
<tr>
<td>Multiply-six</td>
<td>14.7</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Note: Differences in strategy execution were replicated in a control experiment.

3 Thanks to Mark Ashcraft and Jamie Campbell for pointing out this possibility.
preferred over the other in both conversion tasks. The strategy preference phenomenon is not unique to currency conversion: It replicates in the domain of currency conversion tasks the phenomenon of multiple strategy use, a phenomenon that has been found in a number of cognitive domains (see Siegler, 1996, for a review).

Second, in both FF–EUR and EUR–FF conversion tasks, relative strategy use was associated with relative strategy execution. The strategies that were used most often were also the fastest and most accurate, although differences in strategy accuracy were stronger in FF–EUR than in EUR–FF conversion. Note that the differences in strategy execution were not due to prior learning. Indeed, participants did not know these strategies preexperimentally; instead they practiced each strategy on an equal number of problems before the beginning of the experiment. As discussed previously, the different levels of speed and accuracy capture a real difference in the difficulty of strategy execution.

Several sources may have contributed to the different levels of strategy difficulty, such as the nature of arithmetic operations as well as size of the to-be-converted numbers. The present study was not devised to test other features of numbers (like odd-even status of numbers) that have proved influential in arithmetic performance (e.g., Lemaire & Fayol, 1995; Masse & Lemaire, 2001). We could not assess the relative contribution of these potential sources in the present study. To gain further insights, researchers could investigate strategy execution in simple arithmetic by using the choice/no-choice method. Strategies in simple arithmetic have already been widely documented (e.g., Campbell & Xue, 2001; Geary et al., 1993; LeFevre, Bisanz et al., 1996; LeFevre, Sadesky et al., 1996; Lemaire & Siegler, 1995; Siegler, 1988; Siegler & Shrager, 1984). However, all previous studies have used the choice method. Using the choice/no-choice method would help in determining the relative contributions of number size and arithmetic operation in the execution of each strategy, as each arithmetic operation may be investigated separately in problems of varying size.

The third set of important issues that deserves further investigation concerns ecological validity. Often, conversion tasks are accomplished with a superordinate goal in mind that involves other conversions or operations on the result of conversions, such as when people calculate percentages for tips or tax purposes or compare prices in different monetary systems. Conversions in these settings may tax working-memory resources, involve additional processes, or may be determined by prior experience with strategies. Future studies carried out with such complex multistep tasks will help determine whether parameters of working-memory or level of expertise with strategies are critical in people’s performance and will determine how much practice with strategies is necessary to lessen cognitive overload in complex settings.

### Aging Effects in Strategic Aspects of Cognitive Performance

The present study demonstrated age-related similarities and differences in strategy use and execution. Both younger and older adults had strategy preferences; both age groups favored the same strategy in each conversion task; and both age groups favored the strategy with which they performed the fastest. This should not be taken to mean that younger and older adults do not differ in strategy use. First, in the FF–EUR conversion task, younger participants tended to use the add-half strategy more often than older participants. Second, larger age-related differences in currency conversion strategy use may have been observed, had other strategies or problems been tested (e.g., what would happen if the add-half strategy was compared with the multiply-three strategy, requiring participants to divide the amount by 2, multiply the result by 3, and divide this product by 10?). Third, age-related differences in strategy use have been found in simple and complex arithmetic problem solving (e.g., Charness, 1981; Charness & Campbell, 1988; Geary & Wiley, 1991; Geary et al., 1993; Saltzgood & Hertzog, 1998, 2001; Reder, Wible, & Martin, 1986; Rogers, Hertzog, & Fisk, 2000). The features of domains, tasks, or strategies in which age-related differences are either observed, or not, remain unclear. This may prove to be an important issue to address in future research for understanding (a) which aspects of cognition are spared or impaired by age and (b) the role of age-related changes in cognitive performance.

Age-related differences in the present study were most obvious on strategy execution, the most important being younger adults’ faster and more accurate performance. Age-related speed differences increased when participants converted large numbers and/or used the strategy that was most difficult for them. As discussed previously, these differences correspond to pervasive cognitive slowing and Age × Complexity phenomena: Older people are slower to trigger and execute cognitive processes and are even slower on harder problems. The present decrease of performance with age in simple arithmetic is consistent with previous results obtained in simple or complex arithmetic problem verification (e.g., 8 × 4 = 31: True? False?) or production (e.g., 8 × 4 = ?) tasks (e.g., Allen, Ashcraft, & Weber, 1992; Geary & Wiley, 1991; Geary et al., 1993; Saltzgood & Coon, 1994). The results of the present experiment extend these conclusions to complex arithmetic problem-solving tasks in which people have to accomplish several arithmetic operations to solve problems.
Conclusions and Practical Applications

The choice/no-choice method used in the present study enabled us to collect the type of data needed to understand strategy use and execution in younger and older adults’ currency conversion tasks. Currency conversion tasks are not limited to FF–EUR or EUR–FF conversions; they include other between-currency conversions (e.g., to convert Italian liras into euros), Italian people can neglect the last three digits of the amount and divide the resulting number by 2: L 25,000 = € 12.5). Future studies could investigate specificities of currency parity (with some involving whole numbers and others involving decimal numbers), as well as generalities across currencies. Finally, the data reported here suggest that the choice/no-choice method is a fruitful tool for comparing strategies to accomplish laboratory and daily cognitive tasks, and to compare these strategies in people of different ages and, more generally, of different cognitive status.

From a strictly applied point of view, the present results are interesting for understanding the conditions under which converting one monetary system to another may be facilitated. Indeed, converting one currency to another during travel abroad or in the rare cases of countries changing their currencies (e.g., the 12 countries in the Euroland or Honduras’ recent switch to the dollar as its national currency), can be sources of great anxiety. For example, the arrival of the euro makes many Europeans nervous right now, as many people are afraid that they will not know how they will experience this switch in their daily life (e.g., when shopping everyday or when buying less ordinary items, like cars or houses). Moreover, national governments as well as the European community wonder how people can be helped, and particularly whether older people will experience this switch with greater (or even insurmountable) difficulties than younger adults. In addition, some countries, like France, have decided to have a transition period of 6 weeks during which both the euro and the French franc will be available, and people will manipulate both currencies (creating situations of paying in one currency and getting change back in another currency). In this context, people need to know how to do conversions with an effortless method. Beyond showing that older people do not have great difficulties in currency conversion tasks, the present findings reveal that people can be helped by teaching them the add-half strategy for FF–EUR conversions and the divide-three strategy for the EUR–FF conversions. These strategies are the most efficient and are favored by both younger and older people. No particular, idiosyncratic strategies should be taught to older people. Teaching easily executed strategies should be helpful to both younger and older people. Indeed, as an illustration, we compared younger adults’ overall choice latency in this experiment with that of younger adults in another experiment that tested only younger adults in the choice condition (Lemaire et al., 2001) in which people spontaneously used known conversion strategies (other than those taught in this experiment). We observed that people were much faster with these strategies than with the strategies they use spontaneously (12.2 s vs. 15.0 s). In sum, by teaching both younger and older adults one strategy that experimentally proved more efficient for them is one of the keys for facilitating their performance in currency conversion tasks.

References


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