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Explanations of effects of prior income changes on buying decisions

Niklas Karlsson^{*}, Tommy Gärling, Marcus Selart

Department of Psychology, Göteborg University, P.O. Box 500, SE-40530 Göteborg, Sweden

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Abstract

Two experiments with undergraduates as subjects tested explanations of how a prior temporary income change influences choices between buying and deferred buying. In Experiment 1 predictions from the behavioral life-cycle theory (Shefrin & Thaler, 1988), the renewable resources model (Linville & Fischer, 1991) and the loss-sensitivity principle (Gärling & Romanus, 1997) were contrasted. The results are inconsistent with the latter two explanations since the framing of buying as positive (buying a new model of a product) or negative (replacing a broken product) did not interact with the income change. Congruent with the behavioral life-cycle theory, willingness to buy was greater when subjects received a temporary income increase than when they received a temporary income decrease although total assets were equal. Further support for the behavioral life-cycle theory is obtained in Experiment 2 where four income-change conditions and durable and nondurable goods are compared. © 1999 Elsevier Science B.V. All rights reserved.

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^{*} Corresponding author. Tel.: +46-31-773-1938; fax: +46-31-773-4628; e-mail: niklas.karlsson@psy.gu.se

1. Introduction

According to the life-cycle theory (Modigliani, 1988) people strive toward a uniform consumption during the life cycle implying that they take loans when their income is low and is expected to be higher in the future and that they save when their income is higher than expected. Empirical observations have however indicated that current income may be a more important factor than the theory predicts. For instance, it is known that middle-aged households have a higher degree of consumption than younger and older households (Courant, Gramlich & Laitner, 1986). In Shefrin and Thaler's (1988, 1992) *behavioral* life-cycle theory, it is proposed that people decompose wealth into three different mental accounts, current income, current assets and future income and that the propensity to consume differs for these mental accounts. By violating the assumption that money is exchangeable or fungible (Thaler, 1990), other predictions than those of the life-cycle theory are made concerning the role of current income for consumption and savings across the life span.

In a survey of students' expectations of future consumption, Shefrin and Thaler (1988) obtained direct support for the predictions from the behavioral life-cycle theory in that subjects expected to consume more of a windfall gain during a year if money was coded as current income than if it was coded as current assets and that they expected to consume least if it was coded as future income. However, in a similar study by Selart, Karlsson and Gärling (1997) of a Swedish nationwide sample and a student sample, the results differed from those obtained by Shefrin and Thaler (1988). It was found that subjects expected to consume more from current assets than from current income. Since a windfall received immediately as a lump sum was assumed to be coded as current assets and a windfall received as increments per month during the year was assumed to be coded as current income there was a difference when the windfall was received in time. The results obtained were therefore better accounted for by the temporal discounting of future consumption suggested in research on intertemporal choice (e.g., Loewenstein & Prelec, 1992).

The concept of mental account was introduced by Thaler (1980, 1985), Tversky and Kahneman (1981) and Kahneman and Tversky (1984), see also Henderson and Peterson (1992). It refers to the coding and categorizing of which outcomes are going to be evaluated jointly or separately. This coding of outcomes into mental accounts is specific to the decision to be made. It can be distinguished from the mental accounts referred to in the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992) which instead are a priori held mental accounts forming part of people's financial knowledge. Similarly,

Ranyard (1995) makes a conceptual distinction between the formation of specific mental accounts and on-going mental accounts. He argued that the latter are higher order and more stable cognitive structures. Although having attracted research interest (Heath, 1995; Hirst, Joyce & Schadeewald, 1994; Selart et al., 1997; Shefrin & Thaler, 1988, 1992; Thaler, 1990; Winett & Lewis, 1995), the impact of on-going mental accounts on specific decisions has not been investigated.

In the present study, the question was raised whether the behavioral life-cycle theory is capable of accounting for how temporary income changes influence specific buying decisions. Since buying decisions frequently entail intertemporal choices (e.g., between buying or defer buying), it is possible that some alternative explanations are more viable also in this case. More specifically, the aim is to investigate how accurately the behavioral life-cycle theory, the renewable resources model (Linville & Fischer, 1991) or the loss-sensitivity principle (Gärbling & Romanus, 1997) explain why people choose to buy immediately or to defer buying after experiencing a temporary income change.

Linville and Fischer's (1991) renewable resources model deals with people's preferences for temporarily segregating or integrating emotionally significant (social, academic and economic) events, for example, whether people want two positive events to occur on the same or different days. Briefly, the model assumes that people have limited but renewable resources to cope with both positive and negative events. An income increase may be assumed to be perceived as a positive event and an income decrease as a negative event. Furthermore, buying may psychologically either constitute a positive or a negative event. For instance, buying a new attractive model of a consumer product may be perceived to be positive whereas replacing a broken product may be perceived to be negative or at least less positive than buying a new model. If a decision to buy is made following an income increase the renewable resources model predicts that buying is deferred due to a preference for segregating two positive events. On the other hand, since there is a preference to integrate a positive and a negative event, buying is predicted not to be deferred following an income decrease. If buying is negative, the reverse predictions are made: people are assumed to buy following an income increase, whereas they are assumed to defer buying following an income decrease.

A recent explanation of integration and segregation of a prior outcome (for a recent review, see Gärbling, Karlsson, Romanus & Selart, 1997) is the loss-sensitivity principle proposed by Gärbling and Romanus (1997). According to this principle, a prior outcome is only integrated with expected losses. The loss-sensitivity principle has received support in a series of

experiments in which subjects indicated their satisfaction with outcomes of gambling choices (Gärling & Romanus, 1997; Gärling, Romanus & Selart, 1994; Romanus, Hassing & Gärling, 1996; Romanus, Karlsson & Gärling, 1997). If an income change is considered to be a prior outcome, the loss-sensitivity principle states that it will only be integrated with and thus affect a decision to buy when this decision is perceived to be negative (i.e., a loss). Thus, when buying is perceived to be negative it is predicted that people are more willing to buy after an income increase and more willing to defer buying after an income decrease. In contrast, no effect is predicted of an income change when buying is perceived to be positive.

2. Experiment 1

In Experiment 1, subjects were offered hypothetical choices between buying a durable good immediately or defer buying following a temporary income increase or decrease. Income increase and decrease conditions were equivalent with respect to total assets, balanced by the amount of savings in the income-decrease condition. According to the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992), since the propensity to consume is less when saved money has to be used, subjects were expected to buy following an income increase but to defer buying following an income decrease.

In contrast to the behavioral life-cycle theory, the renewable resources model (Linville & Fischer, 1991) and the loss-sensitivity principle (Gärling & Romanus, 1997) make different predictions depending on whether the buying event is positive or negative. In order to make possible to test these predictions, the buying event was positive (buying a new model at a discount rate) for one group of subjects and negative (replacing a broken product) for another group. For a negative buying event, both the renewable resources model and the loss-sensitivity principle predict buying to follow an income increase and defer buying to follow an income decrease. For a positive buying event, the renewable resources model makes the reverse prediction whereas the loss-sensitivity principle does not predict an effect of income change.

2.1. Method

2.1.1. Subjects

Thirty two undergraduates at Göteborg University were paid \$7 for participating in the study. The subjects' mean age was 29.7 years within a range

of 19–46 years. An equal number of men and women were randomly assigned to two different groups with 16 subjects in each.

2.1.2. Materials

Subjects were presented with 16 fictitious choices to buy a CD player, a bookcase, an answering machine and a writing table. Buying event was varied as a between-subjects factor. Half of the subjects were presented with positive buying events and the other half with negative. Furthermore, product price was varied such that in half of the choices the CD player was more expensive than the bookcase and the answering machine more expensive than the writing table and in the other half, the prices of these product pairs were reversed. Half of the subjects were given the two parts in one order, the other half in the reversed order.

Changes in income varied within subjects. In one within-subject condition, subjects were asked to imagine that they had received a temporary income increase which was the equivalent of \$205, \$273, \$342 or \$410.¹ No saved money was available. In another within-subject condition, subjects were asked to imagine that they had received an income decrease of \$205, \$273, \$342 or \$410 and that they had \$410, \$546, \$684 or \$820, respectively, saved in a bank account. In this way, total assets were equal in the income increase and decrease conditions. Prices of the products were always \$137 less than the amount of the income change. The information was displayed and responded to on a computer.

2.1.3. Procedure

Subjects served in groups of four or less. All subjects first read the same general instructions on the computer screen. Subjects were told that they would be presented with fictitious situations and were asked to imagine and respond to them as if they were real. Subjects were given a practice example before starting.

In the group with positive buying events, subjects were asked to imagine that they owned a product (e.g., a CD player) but that they for a long time had been thinking about buying a new and better model. They were also told in this condition that the product was on sale at 33% off normal price. Subjects in the group with negative buying events were told that the product

¹ These amounts were in Swedish Crowns expressed in even hundreds (\$1 is approximately equal to SEK 8).

was broken and that they therefore were thinking about buying a new one. (See Appendix A for the complete wording of the positive and negative buying events). In both buying events, subjects were told that they had found a product that they liked, but that before buying it they first wanted to check the monthly salary they had received on the same day. Subjects were then told about the temporary income increase or decrease and how much they had saved in a bank account.

For each situation, subjects were asked to make a choice between buying the product at once or waiting until later and to rate how decisive they felt of choosing the way they did. Ratings were made on a continuous scale from 0 to 100, where 0 was defined as not especially decisive, 50 as rather decisive and 100 very decisive.

The sessions lasted for about 15 minutes after which subjects were debriefed and paid.

2.2. *Results and discussion*

The ratings of decisiveness were given a positive sign if subjects chose to buy and a negative sign if subjects chose to defer buying. Thus, the dependent variable ranged from -100 to 100 ² with a positive value indicating a preference to buy and a negative value a preference to defer buying.

As the means given in Table 1 show, the decisiveness to buy was greater when subjects received an income increase than when they received an income decrease. Confirming this, a 2 (buying event: positive vs. negative) by 2 (order) by 2 (income change: income increase vs. income decrease) analysis of variance (ANOVA) with repeated measures on the last factor revealed a main effect of income change, $F(1, 28) = 31.43$, $p < 0.001$. This result is in line with the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992) which assumes that the propensity to consume is greater if money from the current-income account can be used than if the current-assets account must be used.

No significant effects involved the buying event. Furthermore, the patterns of results were inconsistent with both the renewable resources model (Linville & Fischer, 1991) and the loss-sensitivity principle (Gärling & Romanus, 1997). The negative results may however not be accounted for by a failure to manipulate the buying event, since when subjects received an income increase

² All analysis reported below were also performed on choice proportions with almost identical results.

Table 1
Mean ratings of decisiveness to buy for different buying events and income-change conditions

Buying event	Income-change condition	
	Income decrease	Income increase
Negative	–25.6	20.6
Positive	–27.3	41.2

the ratings of decisiveness to buy were much larger for the positive buying event than for the negative.

3. Experiment 2

Although the results of Experiment 1 were consistent with the predictions from the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992), the possibility remains that it was the income change in itself, rather than the reluctance to use saved money, which made subjects willing or unwilling to buy. In Experiment 2, four hypothetical situations were introduced: an income increase with no savings, a smaller income increase with savings, an ordinary income with savings and an income decrease with savings. The two intermediate conditions of income change make possible to determine if it was the use of savings (and thus transferring money from a different mental account), the change in income, or a joint effect of the use of savings and change in income, that accounted for the differences in decisiveness to buy, observed in Experiment 1.

Hence, the aim of Experiment 2 was to distinguish between different ways in which mental accounting may impose constraints on buying decisions (see Fig. 1). The specifications presented below do not exhaust all possibilities but represent the three cases which make maximally different predictions concerning how willingness to buy varies with income change:

(1) *Reluctance to use savings*. If the decisiveness to buy is less when subjects have to use saved money, then it is expected that there will only be a difference between receiving an income increase covering the expenses of a purchase and the other conditions where subjects have to use at least some saved money.

(2) *Effect of income change*. People's decisiveness to buy may be directly affected by an income increase or an income decrease. An income increase

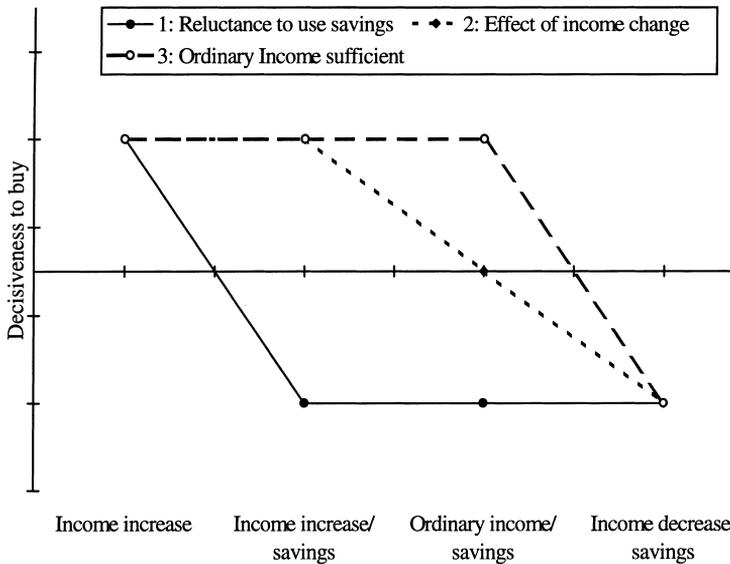


Fig. 1. Different possible outcomes for the decisiveness to buy in different income-change conditions.

may thus be a dominant reason to buy and an income decrease a dominant reason not to buy. Accordingly, the decisiveness to buy for no income change would lie in between

(3) *Ordinary income sufficient*. A third possible outcome is that something wanted is purchased as long as the ordinary income is perceived as sufficient. It is possible that subjects perceive part of their ordinary income as discretionary income (Katona, 1975), that is, as a part of the income that is possible to choose to spend or save. In the case of an income decrease, it is likely that no such discretionary income is perceived. If subjects plan to buy something wanted, it may be expected that the decisiveness to buy is greater if a discretionary income is perceived to be available.

These three possible outcomes can be seen as different reasons for violations of the principle of fungibility (Thaler, 1990). The effect of an income change is, in contrast to the other predictions, not necessarily an indication of the use of mental accounts. However, both *reluctance to use savings* and *ordinary income sufficient* are based on the assumption that the decisiveness to buy is different for different mental accounts (Shefrin & Thaler, 1988, 1992). For *reluctance to use savings*, the prediction is that the decisiveness to buy is less if subjects have to use savings as well as discretionary income, while for *ordinary income sufficient* the prediction is that the

decisiveness to buy is less if subjects have to use savings but not a discretionary income.

Another aim of Experiment 2 was to investigate if an income change and the use of saved money have the same effect on the decisiveness to buy nondurable goods, such as a short vacation trip or buying dinner for friends, as they have on the decisiveness to buy durable goods. Hirst et al. (1994) found that people are more likely to borrow money (i.e., use a future income) for something with long durability than for something with short durability. In line with this, it may be expected that the use of savings is more preferred for buying durable than for buying nondurable goods.

3.1. Method

3.1.1. Subjects

Another 32 undergraduates (16 men and 16 women) at Göteborg University participated as subjects and were randomly assigned to two equally large groups. The subjects' mean age was 24.7 years within a range of 18–42 years. Subjects received the equivalent of \$7 in payment for their participation.

3.1.2. Materials and procedure

Only the positive buying event was used in Experiment 2 (see Appendix A). There were 16 different choices in which product, price, change in income and amount of saved money were varied. Types of goods varied between subjects. Half of the subjects were presented with durable goods and the other half with nondurable goods. In the durable-goods condition, the products were a CD-player, a bookcase, an answering machine and a writing table. The nondurable-good conditions consisted of choices of a vacation trip for four days, arranging a party, a vacation trip for two days and buying dinner for friends.

All subjects were presented with the four different income change situations: income increase with no savings, smaller income increase with savings, ordinary income with savings and income decrease with savings. These situations were constructed so that the total assets were equal. Two price levels for the durable or nondurable goods were used: the price was \$273 when income change plus savings totalled \$410 and it was \$137 when income change plus savings totalled \$273 (see Table 2).

In all other respects, the materials and procedures were the same as in Experiment 1. The task took about 15 min to complete. After completing it, subjects were debriefed and paid for their participation.

Table 2

Amounts of income change and savings for the different income-change conditions ^a

Income-change conditions			
Income increase No savings	Income increase Savings	Ordinary income Savings	Income decrease Savings
\$273 (\$0)	\$68 (\$205)	\$0 (\$273)	–\$273 (\$546)
\$410 (\$0)	\$137 (\$273)	\$0 (\$410)	–\$410 (\$820)

^a Amount of savings in parentheses.

3.2. Results and discussion

The ratings of decisiveness to buy were given a positive sign if subjects chose to buy, otherwise they were given a negative sign. The means are displayed in Fig. 2 for the different income-change conditions. Of the three expected outcomes depicted in Fig. 1, the pattern of results is most similar to that of ‘ordinary income sufficient’. A 2 (good: durable vs. nondurable) by 4 (income change: income increase/no savings vs. income increase/savings vs. ordinary income vs. income decrease) ANOVA with repeated measures on

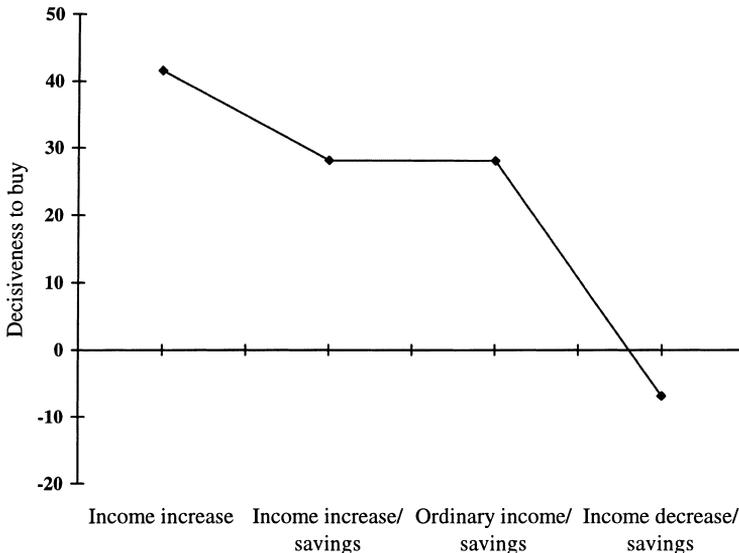


Fig. 2. Mean ratings of decisiveness to buy in different income-change conditions.

the last factor was performed on the ratings. A highly significant and strong main effect was found of income change, $F(2.39, 71.81) = 9.58$ (Greenhouse–Geisser correction of the degrees of freedom), $p < 0.001$. Bonferroni-corrected separate t tests at $p = 0.05$ revealed that only the means for the income-decrease condition differed reliably from the other means. The results thus replicated those of Experiment 1 in showing a reliable difference between income increase and decrease. However, since subjects were equally willing to buy when they had an ordinary income, the results suggested that it is not the income change in itself that affect decisiveness to buy. Thus, more decisive support was obtained for the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992).

Although not statistically significant, the effect of income change tended to differ for durable vs. nondurable goods (see Fig. 3). For nondurable goods, the results were most similar to the ‘ordinary income sufficient’ outcome. However, for the durable goods, the pattern of results was not consistent with any of the stated outcomes. A possible interpretation is that the decisiveness to buy durable goods depends on the income of the specific month, increasing with the increase in income and decreasing with the decrease in income. However, the results also suggested that subjects overall tended to be more decisive to buy the nondurable goods. Another possibility is therefore

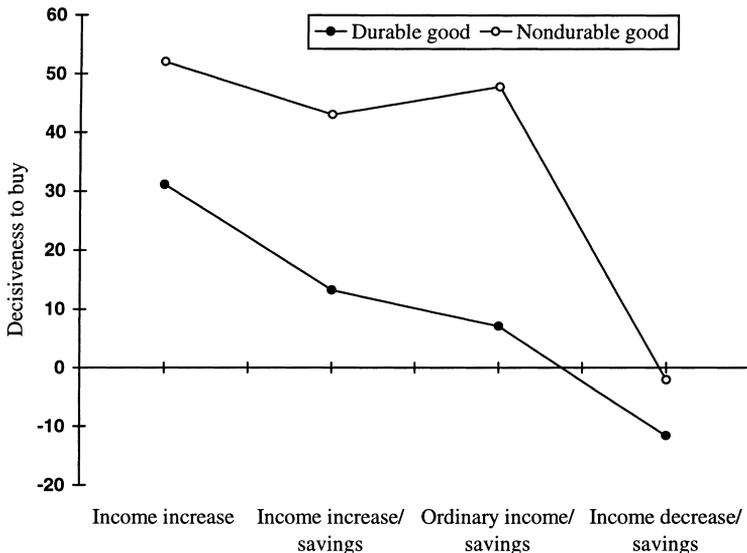


Fig. 3. Mean ratings of decisiveness to buy for different income-change conditions and types of goods.

that differences in attractiveness rather than type of goods account for the differences between nondurable and durable goods.

4. General discussion

The results of both experiments supported the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992). In Experiment 1, neither the pattern of results predicted from the renewable resources model (Linville & Fischer, 1991) nor from the loss-sensitivity principle (Gärling & Romanus, 1997) was observed. Contrary to what was predicted, decisiveness to buy increased for an income increase when the buying event was positive. For an income decrease, the decisiveness to buy was always low. The question arises why these explanations do not seem to be valid in the present study, although they accurately predicted previous results (Gärling & Romanus, 1997; Linville & Fischer, 1991; Thaler & Johnson, 1990; Romanus et al., 1996, 1997). In the present study the choices concerned immediate or deferred buying. A possibility is that achieving self-control, entailed by the use of mental accounts, is more important in such choices than the affective control of events occurring on the same or different days as investigated by Linville and Fischer (1991). For the same reason the loss-sensitivity principle may not apply: That an income change would not be considered when facing a positive buying event appears to be opposed to the goal of self-control.

In all income-change conditions, subjects knew that they had access to the same amount of money. In accordance with the concept of a mental account, the changes in decisiveness to buy thus reflected unwillingness to use saved money. However, in Experiment 1 it was not possible to rule out the possibility that income change itself affected the buying decisions. This possibility was ruled out by the results of Experiment 2.

In Experiment 2, two possible specifications of how buying may be constrained through the use of mental accounts were contrasted to the possibility of an effect of the income change in itself which not necessarily implies the use of mental accounts. In one specification, subjects never used any saved money; in the other, a difference was introduced between saved money and discretionary income (a part of the income which may be spent or saved). The results showed that subjects were not reluctant to use discretionary income for consumption. Hence, the results clearly validated the use of mental accounts in specific buying decisions. This makes the use of mental accounts more apparent as a strategy of self-control.

Although it violates normative theory and the principle of fungibility of money (Thaler, 1990) people may have their reasons for using mental accounts, applying them as a general self-control device. An important question is to what extent the present results from fictitious buying situations are possible to extend to real-life situations. On one hand, subjects may be expected to be more rational when responding to fictitious situations. On the other hand, in real-life situations, factors like temptation and impulsiveness may decrease the effectiveness of mental accounts as a self-control device. Hence, the incentives to use mental accounts may be greater in real life but may at the same time be harder to apply. It is reasonable to believe that the pronounced use of mental accounts in the present experiments also to some degree extend to real-life situations.

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Appendix A. Positive and negative buying event

Positive buying event: Imagine that you have a CD player but that you have been thinking about buying a new and better one for a long time. Today, after looking in different stores, you found a CD player that you think is great. Normally the price of the CD player is SEK 3000 but right now it costs SEK 2000 which is a 33% discount. Before you decide to buy it you want to check your monthly salary that you have received today. Imagine that you have received a temporary income increase (decrease) of 3000 SEK after taxes. You have SEK 0 (6000) saved in a bank account. Would you buy the new CD player now or wait until later?

Negative buying event: Imagine that your CD player is broken and that you therefore are thinking about buying a new one. Today, after looking in different stores, you found a CD player that you think is a good replacement. The price of the CD player is SEK 2000. Before you decide to buy you want

to check your monthly salary that you have received today. Imagine that you have received a temporary income increase (decrease) of SEK 3000 after taxes. You have SEK 0 (6000) saved in a bank account. Would you buy the new CD player now or wait until later?

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