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THE BEHAVIORAL LIFE-CYCLE THEORY OF CONSUMER BEHAVIOR: SURVEY EVIDENCE

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Abstract

We find that survey evidence on faculty pay-cycle choice strongly contradicts the neoclassical theory of consumer behavior. It is more favorable to the behavioral life-cycle theory of Shefrin and Thaler (1988).

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Introduction

The neoclassical theory of consumer behavior makes strong assumptions about the informational and computational bases of consumer behavior. The core assumption is that consumer behavior is reasonably characterized as the maximization of expected lifetime utility subject to a budget constraint and conditional on the available information. In short, consumer behavior can be characterized as the solution to a discounted dynamic programming problem. For economists, this approach has many attractions: it meshes well with traditional notions of economic rationality, it is theoretically tractable (at least in its standard formulations), and it generates predictions that are readily testable (at least apparently). Unfortunately, the available empirical evidence often conflicts with these predictions.

Using a unique, survey-based data set, we uncover some additional difficulties for neoclassical theory. For example, we consider the response of consumers to a very simple optimization subproblem, the solution of which is independent of other choices for a neoclassical consumer. We find that the behavior of even highly educated consumers deviates radically from the neoclassical predictions: they postpone the receipt of income. Furthermore, it appears that many consumers believe that a smooth income stream aids them to control spending. While a preference for income smoothing is a difficulty for the neoclassical model, it is consistent with the predictions of the behavioral life-cycle model of Shefrin and Thaler (1988).

The Behavioral Life-Cycle Model

The standard neoclassical model of consumer behavior has both friendly and adversarial critics. Friendly critics seek better empirical results within the core neoclassical framework and suggest

that the known empirical difficulties lie in the quality of the data, the links between the data and the underlying theoretical variables, or the simplifications that have been invoked to render the theory tractable. While this approach generates a fairly clear research agenda, we believe that the evidence favors a more adversarial approach. Adversarial critics seek better empirical results by means of fundamental changes to the theory of the consumer behavior—changes that allow for bounded rationality, impatience, and rules of thumb. More generally, they treat the existing evidence as fundamentally damaging to the neoclassical theory of consumer behavior.

For example, Thaler (1994, pp. 186-87) criticizes the idea of optimizing consumers on two main grounds: even the simplified theoretical characterization of the consumer's dynamic programming problem is too hard for most consumers to solve, and in any case, inherently impatient consumers lack the self-control needed to follow the saving pattern that would be required if they could solve the optimization problem.[2] On these and related grounds, Thaler (1990, 1994) and Thaler and Shefrin (1981) argue that economists who wish to analyze the consumption-saving decision must address the bounded rationality and impatience of consumers. To this end, they present their behavioral life-cycle theory.

The behavioral life-cycle theory (BLCT) emphasizes self-control, mental accounting, and framing. Shefrin and Thaler (1988) characterize the BLCT as enrichment of the traditional life-cycle theory of saving, but it clearly introduces considerations inimical to the neoclassical

[2]Thaler offers a related third criticism of the standard life-cycle model—that it requires assets to be fungible—that we address below. His notion of fungibility is that wealth accumulation affects consumption regardless of its embodiment (e.g., stock wealth, human wealth, or other). Thaler argues that this is not the case.

paradigm. The BLCT hypothesizes that, because of their "impatience", consumers maintain mental accounts that lead them to treat various components of their wealth as nonfungible. The BLCT uses a concept of impatience that conflicts with the neoclassical theory of the consumer. Impatience is not just a high discount rate; it is "akrasia" or weakness of will. (See Elster 1986 for discussions.) Indeed, Thaler and Shefrin (1981, p.394), following the suggestion of Schelling (1978), model the individual as fragmented into a "farsighted *planner* and a *myopic* doer," creating issues of agency *within* each individual. As they note, these ideas are common outside of economics (Freud 1958; Berlin 1969). Like Ulysses arranging to be tied to the mast, the farsighted planner may adopt strategies to constrain the impulsive doer (Elster 1977). Just as the feasible solutions to agency problems are generally not first best, one of the predictions of the behavioral life-cycle theory of consumption is that people are incapable of achieving their first-best consumption plans. For example, individuals will forego certain income because they are psychologically incapable of managing their saving and spending plans in the manner described by neoclassical consumption theory. The BLCT models consumers as responding to these psychological limitations by adopting rules-of-thumb, such as mental accounts, that are used to constrain the decision making of the "myopic doer".

Shefrin and Thaler (1988) suggest that wealth is divided into three mental accounts—current income, current assets, and future income—and that the temptation to spend is greatest for current income and least for future income. To curb their impatience, some individuals will postpone the receipt of income in order to control spending. This prediction offers a stark contrast with the neoclassical presumption that greater utility derives from an

income stream with a higher present value. Our survey results support this prediction of the BLCT. The behavioral life-cycle hypothesis also predicts the use of mental accounts to restrict the allocation of certain types of income to certain types of consumption. For example, capital gains on housing or retirement accounts may be allocated only to future and not to current consumption. Thaler (1990, p. 198) offers a hypothetical example of two professors with identical annual incomes, although one receives summer teaching pay and one does not. Based on the theory of mental accounts, Thaler predicts greater saving by the professor receiving part of her annual income as a lump-sum payment for summer teaching. Our survey includes a question bearing on this prediction: we ask whether those receiving summer pay treat it like regular income or "earmark" it for particular uses (e.g., debt reduction or other forms of saving).

The Survey

Our evidence comes from a survey we conducted to investigate the salary pay-cycle choices at our university. At American University, as at many other educational institutions, faculty members were traditionally offered a choice of pay period. Each full-time, permanent faculty member chose to receive a nine-month, academic-year salary either over nine months or over twelve months. Choosing the latter simply resulted in an even distribution of the nine-month nominal salary over a full twelve months (the academic year plus the subsequent summer). Clearly, this reduces the present value of the salary payments. For example, consider a professor receiving $60,000 in after-tax income who discounts the end-of-month salary payments at a 0.05 annual discount rate. At the beginning of the academic year, the discounted present value of the nine-month pay plan is $58,767.89, whereas the discounted present value of the twelve-month

pay plan is $58,404.86—a difference of $363.03. In a present-value sense, the 9-month pay cycle is naturally more valuable. So if this professor is on a 12-month pay cycle, a move to a 9-month cycle with no changes in the spending stream would be worth hundreds of dollars in additional wealth each year. While this is not a huge amount, it constitutes a high hourly return for the work involved. Also, since the decision need be made only once, the implied increase in wealth is an order of magnitude larger for any faculty member planning to remain at the university for several years. Finally, the decision to maximize the present value of income is an extremely simple subcomponent of the problem solved by consumers in the standard neoclassical theory of the consumer, and it is separable from the rest of the consumption problem.

Nevertheless, it is widely believed that teachers often select a 12-month over a 9-month pay cycle when both are offered (Thaler and Shefrin 1981, p.400; Loewenstein and Thaler 1989, p.182).[3] In fact, we learned that even some of our colleagues in the Department of Economics had selected the 12-month pay option.[4] We were intrigued, and as we explored the reasons they might have for making such a choice, we decided that it was natural material for a survey study. We designed a survey to determine the proportion of faculty who chose each of the two payment plan options and the reasons for their choices. We also tried to determine how much importance

[3]Loewenstein and Thaler offer this example as suggestive of a negative discount rate, but it is even more problematic than that. It suggests a negative marginal utility of income.

[4]Part of the impetus for this study was our receipt of letters from the university informing us that we would no longer have the option of receiving our salary over nine months. To our surprise, we soon discovered that most of our colleagues (even in the economics department) had not received this letter. The reason: they had been on the twelve month payment plan since they arrived at the university. We were at that point forewarned of the likely tenor of our future findings. (Our surprise apparently manifests what Thaler (2000) calls the "false consensus effect": the irrational tendency to think others are like oneself.)

they lent to these choices. Finally, drawing on the BLCT prediction that income from different sources will be treated differently, we tried to discover whether faculty treat payments for summer teaching differently than they treat payments for their regular duties and whether the choice of pay plan was correlated with the election of summer teaching.

In an attempt to reduce the cost of responding to our survey, we kept it extremely short and provided it on the internet as an HTML form. Faculty who do not teach during the summer were asked only eight questions; three additional questions were asked of faculty who elect summer teaching. The internet location of the survey was emailed to all the full-time, permanent faculty with registered on-campus email addresses at American University. (Almost all full-time permanent faculty have campus email addresses, but of course these receive various levels of use or neglect.) We received survey responses from 109 faculty members.

The actual survey questions appear in the appendix. The survey was conducted electronically and, essentially, anonymously. The questions solicited four types of information: purely factual information about pay-cycle choice (question 1) and summer teaching (questions 6 and 9), explanatory questions about the reasons underpinning pay-cycle choice (questions 2 and 5), quantitative hypothetical questions (questions 4, 7, 8, 10, and 11), and one qualitative hypothetical question (question 3).

Answers to these questions could provide evidence relevant to the predictions of the behavioral life-cycle theory. Of course no single test is determinative. A finding of no deviations from the neoclassical predictions might be attributed to the particular nature of this

planning problem: the problem is so simple and the self-restraint needed to save for the summer so small that all respondents might choose the nine-month payment option and still be unable to solve or execute the much more difficult lifetime-consumption problem. Similarly, a finding of radical deviations from the neoclassical predictions might be rationalized by pointing to the modest benefits of optimal choice: perhaps, relative to the cost of the decision process, these benefits are negligible. We do find radical deviations, but we are not inclined to dismiss them. In our view, the deviant handling of so simple a problem undermines the assumptions of the standard neoclassical theory of the consumer and leads us to expect its failure as a useful description how consumers address their more complicated lifetime-consumption planning problem.

Core Results

The results of the survey are quite startling. Seventy-six of the 109 respondents reported receiving their salary in twelve monthly payments. Moreover, only five of these seventy-six indicated that they even considered the interest losses that this choice entailed. In contrast, of the thirty-three respondents who received their salary in nine monthly payments, twenty-seven indicated that they considered the interest earnings when making their choice. These results suggest that the respondents fall into two distinct groups. The 9-month group (about 30%) make the wealth-maximizing choice of pay cycle, and they cite the reason expected by economists. The 12-month group (about 70%) make the sub-optimal choice (in terms of wealth maximization), and they give no weight to the economically relevant cost of their decision.

The respondents were also asked to select, from a number of possible reasons for their

choice, those reasons that best explained their decision. Of the seventy-six in the 12-month group, sixty-six chose one or both of the following: "ease of planning," or "prefer paycheck to be the same each month." Another six chose the option "fits better with plans for summer earnings." We interpret these selections as indicating a broad concern for enforced income smoothing and an aversion to attempting self-smoothing of consumption in the face of a time-varying income stream. In contrast, of the thirty-three in the 9-month group, twenty-five indicated that they chose this plan because they "prefer to receive income sooner rather than later," while only one indicated that this choice was made to "fit better with plans for summer earnings." So by and large, this group does not value enforced income smoothing. Moreover, because all but two of the twenty-five who preferred to receive income sooner rather than later also considered interest earnings when making their decisions, they appear to be following a logical thought process designed to maximize wealth.

Pursuing this issue further, we wished to determine how important the respondents considered their payment-plan decision to be. We asked them to indicate how inconvenient it would be for them to be forced to switch to the alternative payment plan and to place a rough dollar value on the net loss of such a forced switch. The possible dollar values ranged from zero to $1200. The responses of the 12-month group continued to provide a startling counterpoint to traditional theory: they were *more* strongly attached to their current payment plan than the 9-month group was to theirs. Nearly half (47 percent) of this group indicated that they would find a forced switch to be "very inconvenient" and about another third (35.5 percent) indicated that it would be "somewhat inconvenient." On average the 12-monthers assigned a $544.47 "loss" to a

forced switch. Such strong feelings indicate that enforced income smoothing is quite highly valued indeed.[5] For the 9-month group only 21% indicated that they would find a forced switch "very" inconvenient and another 45.5% indicated that they would find it "somewhat" inconvenient. On average they assigned a $378.79 "loss" to a forced switch. This appears somewhat low, since it only slightly exceeds a plausible annual loss.

Overall, the evidence from questions 1 through 5 reveal a substantial majority of faculty failed to consider interest earnings in their choice of payment plans. Either they do not understand the problem, or more likely, they simply consider the interest costs inconsequential to their decision.[6] The desire for a smooth income stream, which is an important concern for many of the respondents, suggests that they perceive themselves as myopic or impulsive. Apparently they believe the path as well as the value of their (certain) income stream affects their spending patterns. Both of these findings are consistent with the predictions of the behavioral life-cycle theory of consumption, in that people forego certain income either because they are not up to

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[5]In the space for comments, one of the respondents indicated that "The psychological loss of switching from 12 months to 9 months would be greater than the maximum answer allowed to me in the survey."

[6]Several comments from respondents suggest that our survey generated some learning about the problem. For example, one respondent seemed not to consider the possibility of a close-to-zero risk saving vehicle like a money market fund. He/she wrote: "You assume no downside risk to the opp[ortunity] costs of investments of the 3-month earnings wedge. This applies only to rising markets and does not take account of downside risk. I do not think the survey questions are 'neutral' in that there is a bias in the questions which will bias the results." Further discussion with this respondent, who revealed him/herself to us, led us to believe that the survey actually annoyed him/her—not because of bias, but because it revealed lost income of which he/she was previously unaware. Another respondent echoed that concern, writing: "For those of us on 12 month . . . who know on 9 mo[nth] salary we would be able to . . . 'earn' more money each year, this survey is a bit awkward."

solving their optimization problem or because they are psychologically incapable of managing their saving and spending plans in the manner dictated by the solution to their optimization problem. Such an inability to optimize over even the simplest subcomponent strongly suggests that most consumers will be unable either to solve or else to follow the solution of the much more difficult overall problem of planning lifetime consumption.

Our survey also touches upon the related issue of mental accounts. We are interested in whether people "earmark" certain types of income for certain uses. The results already discussed actually bear on this issue indirectly. One plausible interpretation of the fact that the vast majority of our respondents prefer to smooth their income is that current income tends to be used for current consumption. Failure to smooth current income would cause the undisciplined to overspend in the high-current-income months and force them to underspend in the low-current-income months.[7] We further investigate this issue in our questions about summer pay (questions 6 and 9).

For the 12-month group, payment for summer teaching supplements normal monthly income. Neoclassical theory predicts that such an infrequent payment would simply be factored into permanent income or lifetime net worth and would change consumption according to its annuity value. In contrast, the behavioral life-cycle hypothesis predicts that such occasional payments will be treated as windfalls and ear-marked for purposes other than current consumption. For example, Thaler (1990, p.198) says that "when the summer income comes in a

[7]The results and this interpretation, of course, leave open the question of how the undisciplined manage to smooth their once-a-month payments over the entire month.

lump, it will be entered into the assets [saving] account, with a lower MPC." We are inclined to qualify this prediction, since basic mental accounts reasoning does not allow such specific predictions. Rather, if summer income is placed into a separate "account", we expect only that it will be allocated toward a different use than "normal" income. Accordingly, we would expect those in our 12-month group who teach in the summer to allocate their payments for summer teaching to uses other than those for normal income. Since our 9-month group appears to adopt more traditional economic reasoning, we expect them to be more likely to treat summer pay as normal income.

Of the seventy-six who received salary over 12-months, forty-eight taught in the summer at least infrequently. (Nine always taught in the summer, twenty did so frequently, and nineteen infrequently.) Of these forty-eight, nineteen indicated that they used all or part of their summer pay for saving or durables. Another eight indicated that they used it for summer expenses. Only one-third used summer pay solely as normal income. Moreover, of those who taught in the summer infrequently, only three of the nineteen indicated that they treated their summer pay as normal income, while eleven used it for saving or durables.[8] The results indicate, therefore, that the less "normal" summer pay is to the respondent the more likely it is to be earmarked for saving.

For the 9-month group, sixteen of the thirty-three respondents teach in the summer at least infrequently. (Five always teach in the summer, seven frequently do so, and four infrequently do so.) Of these, eight treat the income as normal income, six use it for summer

[8]Four in this category did not respond to this question.

expenses, and only two earmark it for saving. None of the 9-monthers indicated that summer pay is allocated to durable purchases.

Some individuals in each group earmark their summer pay, while others treat it as normal income. However, a much larger proportion of the 12-month group than of the 9-month group (19 of 48 versus 2 of 16) earmark their summer pay for saving or durable goods purchases. This fits with the view that the behavior of those in the 9-month group more closely approximates the predictions of neoclassical consumer theory, while the behavior of those in the 12-month group is better characterized by the BLCT.

Problematic Results

Our other questions (7, 8, 10, and 11) are an attempt to discover whether our respondents treat a known increase in their future income differently than they treat an increase in their current income. The questions attempted to force a response by including a default value, set to zero. Unfortunately, we now suspect that many respondents simply "defaulted" to this value, a view that was reinforced when some of them included comments mentioning their difficulties in thinking about these questions. As a result, we give little weight to our interpretation of the responses of those respondents who gave an answer of zero.

The first two of these questions (question 7 and 8) consider the change in spending plans resulting from a hypothetical increase in after-tax annual salary of $3600 that is announced in May but implemented in September. Question 7 asks for a forecast of the change in monthly expenditures between the time of the announcement and the time of the increase, and question 8

asks for a forecast of the change in expenditures subsequent to the increase. Thirty-seven of the seventy-six respondents in the 12-month group entered a positive number in answer to one or both of these questions, while eighteen of the thirty-three in the 9-month group did so. The economically rational answer would be identical increases in spending by something under $300: identical because in both questions the present value of future income has increased by the same amount. We offered options at $100 increments, so we take "roughly $300" to be the answer best fitting the neoclassical theory of the consumer.[9]

Only three of the 12-month group and one of the 9-month group answered $300 to both questions. An additional seven in the 12-month group and two in the 9-month group at least gave the same number to both questions. Thirteen in the 12-month group and nine of the 9-month group entered a zero response to question 7 and a positive response to question 8. Five of the 12-month group and one of the 9-month group actually indicated that they would increase spending more in anticipation rather than in realization of the income increase. We found these answers puzzling, as we did the fact that the implied MPC's from the answers of all respondents ranged from 0 to 3.33. In general, neither group appeared to think about these hypothetical income increases in a purely rational manner, and their answers are sufficiently perplexing as to cause us to believe that the respondents often misinterpreted the questions.

Questions 10 and 11 are similar to questions 7 and 8, except that they focus on summer earnings. These questions solicit similar speculation about the spending consequences of a one

[9]However, to keep them simple, the questions did not discuss the response of retirement income to this salary increase, nor did they discuss whether the increase was real or nominal.

time increase in summer earnings. These questions were asked only of respondents who indicated that they teach in the summer at least on occasion, which comprised forty-eight 12-monthers and sixteen 9-monthers. Respondents were asked how planned monthly spending, for the summer and for the following academic year, would respond to a decision to teach an additional summer course in order to earn an additional $3,600 (after-taxes). Neoclassical consumer theory predicts a very small response in both periods.

Nine of the forty-eight 12-monthers indicated that they would make a large increase ($800 or more) in their monthly summer spending, but twenty indicated they would make no change in either period.[10] In addition, ten of the sixteen 9-monthers indicated that this summer teaching would have no effect on their spending during the summer or during the acadmic year. Since the choices we offered moved in $100 increments, "roughly $0" is the choice predicted by the neoclassical model. Some other responses were somewhat close to this, but many of the remaining responses deviated markedly from the neoclassical prediction. For example, several of the responses indicated a large increase in spending during the summer with little or none subsequently. Broadly speaking, the 9-monthers cluster near the prediction of the neoclassical model while the answers of the 12-monthers are more varied. Again we caution that the pattern of answers suggests that respondents had difficulties with these questions, which is very disappointing since the questions are potentially very revealing. Nevertheless, it is clear that

[10]Sixteen of these twenty also indicated no response of monthly spending for questions 7 and 8. Similarly eight of the ten 9-monthers who indicated no response for questions 10 and 11 also did so for questions 7 and 8. To reiterate: we are concerned that some of these respondents may simply have "defaulted" to zero for all of these questions because they felt uncertain about how to answer. Some of the "zero" responses may equate to "unable to answer", and future surveys may find it useful to address this possibility.

many of the respondents indicated that they would behave in ways that deviate markedly from the predictions of neoclassical consumer theory.

Conclusion

We find that our survey evidence on faculty pay-cycle choice strongly contradicts the neoclassical theory of consumer behavior. It is more favorable to the behavioral life-cycle theory of Shefrin and Thaler (1981). The behavioral life-cycle theory is not disputing that consumers are rational in the broad sense of the term: they have reasons for their behavior. The dispute concerns the constitution of rationality, not the fact of rationality (Simon 1986). Our evidence suggests that the behavior of even highly educated consumers is not well characterized by neoclassical consumer theory. The evidence also strongly suggests that consumers are willing to pay for income smoothing, which poses an insurmountable problem for neoclassical theory. Possible explanations include computational failure or the adoption of strategies to overcome "weakness of will". Finally, our results offer some evidence in favor of the "mental accounts" hypothesized by the behavioral life-cycle theory.

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Appendix

The survey is available at http://www.american.edu/econ/paychoice.htm. It opens by briefly introducing us, noting that the survey is part of an academic research project, noting that the survey is very short, and promising confidentiality of the responses. We reproduce the questions and key instructions from the survey in this appendix.

Annual and Summer Pay: Understanding Choices

1.You receive your basic annual salary on a
[]9-month cycle
[]12-month cycle

2.Why do you use the 9-month pay cycle or 12-month pay cycle?
[]Did not know there were two pay options.
[]Ease of planning.
[]Prefer paycheck to be the same each month
[]Prefer to receive income sooner rather than later.
[]Fits better with plans for summer earnings.
[]Complete indifference between the two options.

3.Suppose the university must place all faculty on the same pay cycle. Suppose that this results in switching your current pay cycle (9 or 12 month) to the alternative pay cycle (12 or 9 month). How inconvenient will you find this.
[]Very inconvenient.
[]Somewhat inconvenient.
[]Not at all inconvenient.

4.Suppose the university must place all faculty on the same pay cycle. Suppose that this results in switching you from your preferred pay cycle (9 or 12 month) to the alternative pay cycle (12 or 9 month). Try to put a dollar value on the net "loss" (psychological, monetary, etc.) that you experience due to this switch off of your preferred pay cycle.
[Options: $0-$1200 at $100 increments.]

5.When you chose a 9-month or a 12-month pay cycle, did your potential interest earnings influence your choice?
[]Yes.
[]No.

6.Do you teach during the summer?
[]Always
[]Frequently
[]Infrequently
[]Never

7.Suppose you learn in May 1999 that you will receive an increase in your basic annual salary of $3,600 (after taxes), effective September 1999. By how much (roughly) does this news raise your planned *monthly* spending for the 3 months of the *summer of 1999*?
[Options: $0–$1200 per month, at $100 increments.]

8.Suppose you learn in May 1999 that you will receive an increase in your basic annual salary of $3,600 (after taxes), effective September 1999. By how much (roughly) does this news raise your planned *monthly* spending for the 9 months of the *1999/2000 academic year*?
[Options: $0–$1200 per month, at $100 increments.]

If you never teach during the summer:
you have finished the survey.
Please go to the bottom of the survey and click on the submit button.
Otherwise, please answer the following questions.

9. Which of the following best describe how you use your pay from summer teaching?
[]Pay for normal increased summer expenses (such as vacation, childcare, or August tax bill)
[]Help buy durable goods (such as a stereo or dishwasher)
[]Increase your savings (e.g., add to a savings account or mutual fund)
[]Spend along with normal income, such as your basic annual salary.

10.Suppose you decide to teach an additional summer course, thereby raising your summer income by $3,600 (after-taxes) during the summer of 1999. By how much (roughly) does this news raise your planned *monthly* spending for the three months of the *summer of 1999*?
[Options: $0–$1200 per month, at $100 increments.]

11.Suppose you decide to teach an additional summer course, thereby raising your summer income by $3,600 (after-taxes) during the summer of 1999. By how much (roughly) does this news raise your planned *monthly* spending for the 9 months of the *1999/2000 academic year*?
[Options: $0–$1200 per month, at $100 increments.]

End of Survey:
Please follow the directions below to submit this survey.
We welcome comments and suggestions related to this survey:
[Text Area for comments.]
[Submit Survey button.]

If you are connected to the Internet:
you can now submit this survey by clicking the *Submit Survey* button.
If you have downloaded your mail to read offline:
please reconnect before submitting the survey.
Note: You will receive a warning that submitting the form will reveal your email address. We will not retain this information during form processing. Your answers will *entirely confidential*. We will request *no additional participation*.
If you wish, you can clear the form by clicking [Start Over button].