E-Companion to "Experienced and Prospective Wait in Queues: A Behavioral Investigation"

Appendix O.1. Experimental Design of Control Tasks

Appendix O.1.1. Control tasks and Exit Survey

In our study, we conduct two control tasks. In the value-of-time task, we employ the BDM mechanism to elicit participants' cost of opportunity for a two-minute wait (for a similar approach, see Eckel and Grossman 2002), which is similar to the average waiting time of the QT. Specifically, each participant is first required to state the minimum number of tokens, Z, that they are willing to accept as payment for a two-minute wait. Then, Nature randomly selects a number, Y, from a uniform distribution between 1 and 150 tokens. If Y is larger than Z, then the participant receives a payment of Y tokens after waiting for two minutes. Otherwise, if $Y < Z$, then the participant skips the two-minute wait and does not receive any tokens from the task. Participants also learn that stating Z equal 0 (150) ensures that they wait (do not wait) for two minutes for certain. Note that, by designing the value-of-time task with a similar waiting time but a larger range of possible random payments than in the QT, we can have a more general understanding of people's value of time. This is particularly the case given that, in the QT, there is no reason for a participant to require a payment of more than 100 tokens to leave the queue, since the store's reward is equal to 100 tokens. However, such a natural upper limit does not exist in the case of the control task.

To measure participants' risk preferences, we follow a similar approach to Gneezy and Potters (1997) and design an investment game in which each participant receives an endowment of 15 tokens and must decide how many tokens to put into a risky investment. Then, Nature randomly determines whether the participant wins or loses the game, with equal chances. If the participant wins, then they get a return of 2.5 times the investment, plus the rest of the initial endowment (i.e., the amount out of the 15 tokens that were not invested). Otherwise, the participant loses the investment and receives only the non-invested portion of the initial endowment. Therefore, a participant's investment captures a measure of risk tolerance: less (more) risk-averse participants are expected to invest more (fewer) tokens in the game. We include this risk-preferences task because people's attitudes towards risk may have an impact on participants' decisions in the QT, since the randomly-generated values from the BDM mechanism help to determine whether someone stays or leaves a queue.

After participants finish the QT and control tasks, they proceed to the exit survey, which consists of: (1) questions about their decisions in the QT; and (2) a demographic questionnaire.

Appendix O.2. Summary Statistics for All Studies

Table O.1 shows the summary statistics of completion cost, separately for each study and experimental condition (i.e., set of queue parameters). Table O.2 presents additional information.

Table O.1: Summary Statistics of Completion Cost for All Studies

Study	Length (l) (customers)	Exp. Length (w) (places)	Service Time (s) (secs./customer)				
			5	**10**	**20**	**30**	**45**
1	7	0	21.51 (29.55) N=71	30.61 (29.49) N=69	38.29 (31.14) N=65	\	\
	7	3	26.67 (28.84) N=66	29.97 (26.98) N=71	34.50 (30.79) N=66	\	\
	7	6	20.76 (25.36) N=75	36.45 (30.14) N=64	34.84 (31.90) N=57	\	\
	10	0	28.13 (32.68) N=71	31.51 (29.59) N=70	44.98 (33.02) N=64	\	\
	13	0	32.32 (31.64) N=74	36.53 (32.20) N=59	45.90 (27.70) N=60	\	\
2	7	0	\	27.95 (31.36) N=96	\	38.72 (31.54) N=92	\
	7	1	\	\	\	41.31 (34.95) N=65	\
	7	3	\	\	\	40.39 (30.22) N=59	\
	7	6	\	\	\	41.25 (33.63) N=61	\
	7	9	\	34.40 (32.72) N=57	\	32.53 (27.80) N=62	\
	7	12	\	29.27 (32.85) N=60	\	31.86 (31.60) N=59	\
	16	0	\	40.37 (31.74) N=90	\	46.97 (31.67) N=92	\
3	7	0	\	30.21 (32.11) N=67	\	41.29 (29.76) N=66	\
	16	0	\	33.32 (29.00) N=66	\	46.76 (30.30) N=67	\
4	7	0	\	\	\	\	41.93 (27.83) N=61
	7	3	\	\	\	\	42.66 (28.15) N=61
	7	6	\	\	\	\	37.50 (28.08) N=62
	7	9	\	\	\	\	36.33 (29.56) N=60
	7	12	\	\	\	\	34.87 (26.67) N=62
	7	15	\	\	\	\	40.44 (34.64) N=62

Note. Mean (standard deviation) of completion cost, in tokens. The conversion rate in studies 1, 2, and 3 (study 4) is equal to 150 (75) tokens for each US dollar. N denotes the number of observations in each cell.

Appendix O.3. Regression Results for Study 2

The complete regression results from Study 2, Models (1)–(4), are shown in Table O.3.

Table O.2: Additional Information About Each Study

Study	No. of Subjects	Rounds	Wait Time Range per Queue	% of Female	Ave. Age	Ave. Payment
1	259	4	35 secs. to 4.3 mins	53.67%	29.48	$6.65
2	402	2	1.2 mins to 9.5 mins	51.49%	38.35	$5.41
3	134	2	1.2 mins to 8 mins	49.25%	39.59	$5.35
4	368	1	5.25 mins to 16.5 mins	50.54%	37.42	$5.29

Table O.3: Regression Results for Completion Cost: Study 2

	Model (1)	Model (2)	Model (3)	Model (4)
Intercept	25.93**	26.12**	26.07**	25.09**
	(9.81)	(9.16)	(8.51)	(8.52)
ServTime	15.90**	17.44***	14.51**	17.95***
	(5.93)	(5.00)	(5.26)	(4.88)
Length	16.98**		14.38**	14.92**
	(5.93)		(5.24)	(5.24)
ServTime · Length	-7.10		-5.97	-8.06
	(8.37)		(7.34)	(6.86)
ExpLength		0.48		0.39
		(0.51)		(0.49)
ExpLength · ServTime		-1.28+		-1.25+
		(0.75)		(0.72)
Waited			3.68	
			(5.25)	
ServTime · Waited			-5.88	
			(7.01)	
Round_2	-3.23	-2.86	-2.40	-2.30
	(4.19)	(2.53)	(2.03)	(2.03)
Risk	-0.74	-0.67	-0.62	-0.65+
	(0.46)	(0.42)	(0.39)	(0.39)
TimeValue	0.02	0.05	0.04	0.04
	(0.04)	(0.04)	(0.04)	(0.04)
Male	-4.09	-5.66	-4.64	-4.68
	(4.23)	(3.97)	(3.67)	(3.65)
Age	0.12	0.08	0.09	0.10
	(0.17)	(0.17)	(0.15)	(0.15)
Log Likelihood	-1533.30	-2449.14	-3214.45	-3212.75
R^2	0.057	0.033	0.036	0.041
N	370	611	793	793

Note. Standard errors in parentheses. ServTime (Length) is dummy variables equal to 1 when the service time (prospective length) is equal to 30 secs./customer (16 customers). $^{+}p < 0.10$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Appendix O.4. Robustness Regression Results for Study 3

The additional robustness regression results from Study 3 are shown in Table O.4.

Appendix O.5. Prospective Queue and Anticipated Unpleasantness

Table O.5 shows the regression results for anticipated unpleasantness in Studies 1, 2 and 3. In all cases, the results show responses to the prospective queue, i.e., Model (1) with observations where the experienced length is equal to 0 ($w = 0$), but with anticipated unpleasantness as the dependent

Table O.4: Robustness Regression Results for Completion Cost: Study 3

	(1)	(2)
Intercept	39.97^{***}	40.67^{***}
	(11.29)	(11.50)
ServTime	16.58^{***}	15.40^{**}
	(3.30)	(4.93)
Length	7.12^{*}	5.91
	(3.32)	(5.01)
ServTime · Length		2.35
		(7.32)
Round_2	-0.92	-0.92
	(2.99)	(2.98)
Risk	-2.34^{***}	-2.35^{***}
	(0.61)	(0.61)
TimeValue	-0.04	-0.04
	(0.06)	(0.06)
Male	2.87	2.96
	(5.53)	(5.53)
Age	0.16	0.16
	(0.22)	(0.22)
Log Likelihood	-1098.46	-1098.41
R^2	0.135	0.135
N	266	266

Note. Standard errors in parentheses. ServTime (Length) are dummy variables equal to 1 when the service time (prospective length) is equal to 30 secs./customer (16 customers). $^{*}p < 0.10$, $^{**}p < 0.01$, $^{***}p < 0.001$.

variable. The results mirror our main observation in Result 1: as with completion costs, unpleasantness increases linearly with service time and length, while their interaction has no statistically significant effect.

Appendix O.6. Wage Rate Result

Here, we explore the effect of queuing characteristics when we consider wage rate as the dependent variable. The results are shown in Table O.6. Note that we remove the interaction of service time and length, i.e., the total wait time, because the measurement for wage rate already considers it in its denominator. As in §5, we only consider data from Studies 1, 2, and 3 because the focus of this analysis is on responses to the prospective queue, which is not addressed in Study 4. Contrary to a fully-rational model (where the wage rate should be independent of queue parameters), we find that it significantly decreases with length and service time.

Appendix O.7. Robustness Check: Multi-round Effects

To explore whether our results may be due to the multi-round nature of our experimental design, we compare regression analyses using: (i) data from all rounds; (ii) data from round 1 only; and (iii) all rounds, but controlling for previous realizations of the BDM procedure. We perform these three variations separately for: Model (1) and data with $w = 0$ from Studies 1–3, to study the prospective

Table O.5: Regression Results for Expected Unpleasantness

	DV: Unpleasantness		
	Model (1): Study 1	Model (1): Study 2	Model (1): Study 3
Intercept	4.92***	3.77***	4.16***
	(0.24)	(0.32)	(0.36)
ServTime	0.06***		
	(0.01)		
Length	0.10***		
	(0.02)		
ServTime · Length	-0.00		
	(0.00)		
ServTime_{30}		0.57**	0.64**
		(0.19)	(0.22)
Length_{16}		0.93***	0.81***
		(0.19)	(0.22)
$\text{ServTime}_{30}\cdot \text{Length}_{16}$		-0.06	-0.07
		(0.27)	(0.32)
Round_2	-0.42**	-0.02	0.01
	(0.15)	(0.14)	(0.16)
Round_3	-0.19		
	(0.15)		
Round_4	-0.32*		
	(0.15)		
Risk	0.02	0.02	-0.01
	(0.01)	(0.01)	(0.02)
TimeValue	0.00***	-0.00	-0.00
	(0.00)	(0.00)	(0.00)
Male	-0.22*	-0.11	-0.08
	(0.11)	(0.14)	(0.16)
Age	-0.03***	-0.00	-0.00
	(0.01)	(0.01)	(0.01)
Log Likelihood	-996.12	-616.50	-438.69
R^2	0.160	0.153	0.143
N	603	370	266

Note. Standard errors in parentheses. ServTime (Length) are dummy variables equal to 1 when the service time (prospective length) is equal to 30 secs./customer (16 customers). All cases only consider prospective queue (i.e., $w = 0$). $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

queue; and Model (2) and data with $l = 7$ from Studies 1, 2, and 4, to study the experienced queue.[21] The results are presented in Table O.7. In all cases, we find qualitatively similar results. In particular, in the first 3 columns, we find a significant effect of prospective length and service time, but not their interaction; and in the last 3 columns, we find no significant effect of experienced length or its interaction with service time. As a result, we conclude that the multi-round nature of our studies did not significantly affect, and can therefore explain, our main findings.

[21] The analyses with all rounds match those presented in the last columns of Tables 7 and 8.

Table O.6: Regression Results for Wage Rate (Studies 1, 2 and 3)

	(1)
	Wage Rate
Intercept	14.52***
	(1.52)
Length	-0.36***
	(0.08)
ServTime	-0.28***
	(0.03)
Round_2	-0.75
	(0.68)
Round_3	-0.23
	(1.00)
Round_4	-2.35*
	(1.02)
Risk	-0.08
	(0.07)
TimeValue	0.02*
	(0.01)
Male	0.71
	(0.60)
Age	0.01
	(0.03)
Log Likelihood	-4084.64
R^2	0.111
N	1239

Note. Standard errors in parentheses.
$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

Table O.7: Regression Results for Multiple-round Effects

	Studies 1,2,3			Studies 1,2,4		
	(1) All rounds	(2) Round 1	(3) All rounds with *AveRealizationX*	(4) All rounds	(5) Round 1	(6) All rounds with *AveRealizationX*
Intercept	31.35***	39.16***	31.35***	14.49***	8.86	14.47***
	(5.28)	(6.88)	(5.29)	(4.02)	(5.56)	(4.02)
ServTime	0.90***	0.57**	0.90***	0.66***	0.91***	0.66***
	(0.11)	(0.19)	(0.11)	(0.08)	(0.14)	(0.08)
Length	1.36***	1.50*	1.35***			
	(0.33)	(0.60)	(0.33)			
ServTime · Length	-0.02	-0.04	-0.02			
	(0.03)	(0.04)	(0.03)			
AveRealizationX			-0.02			-0.02
			(0.05)			(0.04)
ExpLength				-0.12	-0.38	-0.12
				(0.22)	(0.51)	(0.22)
ServTime · ExpLength				0.00	0.00	0.00
				(0.01)	(0.02)	(0.01)
Round_2	-4.48*		-3.28	-3.84**		-2.69
	(2.02)		(3.19)	(1.25)		(2.13)
Round_3	-2.41		-1.25	-5.10**		-3.91
	(2.96)		(3.80)	(1.95)		(2.65)
Round_4	-5.86*		-4.66	-5.34**		-4.16
	(2.97)		(3.87)	(1.99)		(2.68)
Risk	-0.76*	-1.35***	-0.76*	-1.00***	-0.93**	-1.00***
	(0.31)	(0.40)	(0.31)	(0.24)	(0.32)	(0.24)
TimeValue	0.05+	-0.04	0.05+	0.05*	0.04	0.05*
	(0.03)	(0.04)	(0.03)	(0.02)	(0.03)	(0.02)
Male	0.64	-1.00	0.70	1.16	1.86	1.17
	(2.68)	(3.64)	(2.68)	(2.00)	(2.46)	(2.00)
Age	0.04	0.21	0.04	0.26**	0.29**	0.26**
	(0.11)	(0.16)	(0.11)	(0.09)	(0.11)	(0.09)
Log Likelihood	-5075.52	-1981.90	-5075.40	-6449.21	-3641.67	-6448.99
R^2	0.054	0.060	0.054	0.179	0.180	0.179
N	1239	473	1239	1583	837	1583

Note. Columns (1)-(3) use completion cost in *tokens* as the dependent variable; columns (4)-(6) consider them, in *cents* to account for the difference in conversion rate in Study 4. Standard errors in parentheses. $^{+}p < 0.10$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.