The Effect of Self-Control on the Construction of Risk Perceptions

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ONLINE APPENDIX

Appendix 1: Eliciting Risk Perception

Below are samples of the survey instruments we tested for computer based (qualtrics.com) and paper and pencil (pre-test) studies, respectively in Studies 1 and 2. Keywords were highlighted to aid participants' reading comprehension.

How serious for you do think are the health **consequences** of heart disease?

1 = Not Serious At All	2	3	4	5	6	7	8	9	10 = Extremely Serious
○	○	○	○	○	○	○	○	○	○

What do you think are your **chances** of getting heart disease if you eat a lot of unhealthy foods?

1 = Extremely Unlikely	2	3	4	5	6	7	8	9	10 = Extremely Likely
○	○	○	○	○	○	○	○	○	○

How **threatening** do you think heart disease is if you eat a lot of unhealthy food?

1 = Not Threatening At All	2	3	4	5	6	7	8	9	19 = Extremely Threatening
○	○	○	○	○	○	○	○	○	○

(please mark with X below)

How serious do you think are the health consequences of heart disease?

_____

1 2 3 4 5 6 7 8 9 10

Not serious at all Extremely Serious

What do you are your chances of getting heart disease if you eat a lot of unhealthy foods?

_____

1 2 3 4 5 6 7 8 9 10

Extremely Unlikely Extremely Likely

How threatening do you think heart disease is if you eat a lot of unhealthy food?

_____

1 2 3 4 5 6 7 8 9 10

Not threatening at all Extremely threatening

Appendix 2: Absolute Perceptions of Consequences of Risks in Experiment 1

	Samples Means					Adjusted Means^				
Risk	LowSC	SE	HighSC	SE	Sig.	LowSC	SE	HighSC	SE	Sig.
High Personal Agency										
Heart disease from overeating	8.06	*0.27*	8.05	*0.22*	*.96*	8.05	*0.26*	8.05	*0.26*	*.99*
Diabetes from overeating	8.40	*0.26*	7.92	*0.22*	*.16*	8.35	*0.25*	7.98	*0.25*	*.31*
Speeding crash	8.15	*0.26*	7.93	*0.26*	*.57*	8.24	*0.26*	7.96	*0.26*	*.48*
Lung cancer from smoking	8.71	*0.27*	8.58	*0.28*	*.74*	8.79	*0.27*	8.56	*0.27*	*.56*
Illness from GM foods	5.90	*0.28*	6.11	*0.30*	*.61*	5.97	*0.30*	6.06	*0.31*	*.84*
Low Personal Agency										
Plane crash	8.89	*0.30*	8.12	*0.33*	*.09*	8.93	*0.31*	8.21	*0.31*	*.11*
Avian flu from traveling	7.26	*0.35*	7.19	*0.35*	*.25*	7.35	*0.36*	7.22	*0.37*	*.80*
Car breakdown	6.16	*0.29*	6.18	*0.29*	*.96*	6.05	*0.31*	6.23	*0.32*	*.71*
Hard-drive crash	7.71	*0.28*	7.42	*0.28*	*.47*	7.61	*0.30*	7.42	*0.31*	*.68*

Note. High and low self-control groups are determined by a median split of the self-control scale

^ Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

Appendix 3: Absolute Perceptions of Probabilities of Risks in Experiment 1

	Samples Means					Adjusted Means^				
Risk	LowSC	SE	HighSC	SE	Sig.	LowSC	SE	HighSC	SE	Sig.
High Personal Agency										
Heart disease from overeating	7.26	*0.20*	7.69	*0.19*	*.13*	7.27	*0.21*	7.65	*0.22*	*.23*
Diabetes from overeating	6.67	*0.27*	7.20	*0.22*	*.12*	6.63	*0.26*	7.17	*0.26*	*.16*
Speeding crash	6.48	*0.26*	6.94	*0.26*	*.22*	6.59	*0.28*	6.78	*0.28*	*.65*
Lung cancer from smoking	7.90	*0.28*	8.68	*0.22*	*<.05*	7.92	*0.26*	8.59	*0.27*	*.08*
Illness from GM foods	4.67	*0.26*	5.40	*0.28*	*<.05*	4.68	*0.28*	5.39	*0.29*	*.10*
Low Personal Agency										
Plane crash	3.60	*0.27*	4.22	*0.25*	*.13*	3.62	*0.28*	4.22	*0.28*	*.15*
Avian flu from traveling	4.95	*0.25*	5.22	*0.24*	*.44*	4.88	*0.26*	5.19	*0.27*	*.42*
Car breakdown	5.97	*0.26*	5.91	*0.24*	*.88*	5.91	*0.27*	5.98	*0.27*	*.87*
Hard-drive crash	5.83	*0.25*	6.40	*0.24*	*.26*	6.00	*0.25*	6.41	*0.25*	*.25*

Note. High and low self-control groups are determined by a median split of the self-control scale

^ Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

Appendix 4: Absolute Perceptions of Overall Threat of Risks in Experiment 1

	Samples Means					Adjusted Means^				
Risk	LowSC	SE	HighSC	SE	Sig.	LowSC	SE	HighSC	SE	Sig.
High Personal Agency										
Heart disease from overeating	7.42	*0.24*	8.12	*0.23*	*.56*	7.96	*0.24*	8.05	*0.24*	*.80*
Diabetes from overeating	7.56	*0.28*	7.48	*0.24*	*.83*	7.44	*0.27*	7.56	*0.28*	*.78*
Speeding crash	7.08	*0.29*	7.50	*0.25*	*.28*	7.14	*0.29*	7.50	*0.29*	*.41*
Lung cancer from smoking	8.20	*0.27*	8.83	*0.22*	*.08*	8.20	*0.26*	8.75	*0.26*	*.15*
Illness from GM foods	4.42	*0.26*	5.61	*0.30*	*<.05*	4.49	*0.29*	5.51	*0.30*	*<.05*
Low Personal Agency										
Plane crash	5.47	*0.37*	5.66	*0.34*	*.70*	5.50	*0.37*	5.69	*0.38*	*.73*
Avian flu from traveling	5.77	*0.32*	6.26	*0.28*	*.89*	5.79	*0.32*	6.25	*0.32*	*.33*
Car breakdown	5.23	*0.30*	5.28	*0.27*	*.90*	5.07	*0.31*	5.40	*0.32*	*.47*
Hard-drive crash	6.10	*0.32*	6.45	*0.29*	*.41*	5.85	*0.32*	6.55	*0.32*	*.14*

Note. High and low self-control groups are determined by a median split of the self-control scale

^Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

* We also explored the possibility that self-control influenced the range (not the mean value) of perceived risk, but found this was unlikely. A correlation of self control (the individual difference scale) and within-subjects standard deviation of threat, consequence, and probability of each high self-control risk yielded non-significant correlations of $r = 0.40$ ($p = .66$), $r = 0.43$ ($p = .64$), $r = 0.003$ ($p = .97$), respectively.

Appendix 5: Absolute Perceptions of Consequences of Risks in Experiment 2

	Sample Means						Adjusted Means^					
Risk	Control	SE	LowSC	SE	HighSC	SE	Control	SE	LowSC	SE	HighSC	SE
Heart disease from overeating	8.55	*0.37*	9.30	*0.18*	9.00	*0.30*	8.67	*0.30*	9.24	*0.31*	8.96	*0.33*
Speeding crash	7.79	*0.35*	8.41	*0.29*	8.48	*0.31*	7.97	*0.31*	8.38	*0.31*	8.31	*0.33*
Liver damage from drinking	8.03	*0.45*	8.48	*0.32*	8.64	*0.44*	8.11	*0.41*	8.46	*0.42*	8.57	*0.44*
Lung cancer from smoking	8.48	*0.41*	8.19	*0.27*	9.04	*0.36*	8.59	*0.36*	9.18	*0.36*	8.92	*0.38*

Note. There are no significant differences between control and low and high self-control conditions, except for the low self-control treatment having a marginally higher perception of consequence of heart disease ($p = 0.09$). This difference disappears once demographics are controlled for.

^Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

Appendix 6: Absolute Perceptions of Probabilities of Risks in Experiment 2

	Sample Means						Adjusted Means^					
Risk	Control	SE	LowSC	SE	HighSC	SE	Control	SE	LowSC	SE	HighSC	SE
Heart disease from overeating	7.64	*0.21*	7.78	*0.20*	7.60	*0.17*	7.73	*0.20*	7.73	*0.20*	7.55	*0.21*
Speeding crash	7.36	*0.28*	7.04	*0.30*	7.13	*0.28*	7.46	*0.28*	6.97	*0.28*	7.09	*0.30*
Liver damage from drinking	7.93	*0.31*	7.78	*0.25*	7.73	*0.36*	8.00	*0.30*	7.67	*0.32*	7.77	*0.31*
Lung cancer from smoking	8.39	*0.24*	8.58	*0.23*	8.33	*0.25*	8.46	*0.24*	8.28	*0.26*	8.56	*0.24*

Note. There are no significant differences between control and low and high self-control conditions (p's > 0.1).

^Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

Appendix 7: Absolute Perceptions of Overall Threat of Risks in Experiment 2

	Sample Means						Adjusted Means^					
Risk	Control	SE	LowSC	SE	HighSC	SE	Control	SE	LowSC	SE	HighSC	SE
Heart disease from overeating	7.97	*0.24*	8.22	*0.28*	8.12	*0.26*	8.01	*0.26*	8.15	*0.26*	8.15	*0.28*
Speeding crash	7.62	*0.32*	7.48	*0.35*	7.92	*0.27*	7.78	*0.30*	7.36	*0.31*	7.87	*0.32*
Liver damage from drinking	8.17	*0.31*	8.04	*0.32*	8.16	*0.37*	8.29	*0.33*	7.93	*0.33*	8.14	*0.35*
Lung cancer from smoking	8.66	*0.26*	9.22	*0.25*	8.96	*0.26*	8.73	*0.25*	9.18	*0.26*	8.91	*0.27*

Note: There are no significant differences between control and high and low self-control conditions (p's > 0.1).

^Adjusted means control for age, income, race, gender, body mass index (BMI), and physical activity level of the study participants.

Appendix 8: Results for Regression Model (3) in Experiment 1

	Standardized Beta for Predictor in Regression Model (3)											
Risk	Consequence		Probability		Self-Control		Cons*SC		Prob*SC			
	a	sig.	*b*	sig.	*C*	sig.	*d*	sig.	*e*	sig.	adj R^2	BIC of Model (3)
High Personal Agency												
Heart disease from overeating	-2.90	*.02*	2.73	*.05*	-0.07	*.58*	3.41	*<.01*	-2.35	*.12*	.52	-345
Diabetes from overeating	-2.32	*.24*	6.30	*<.01*	1.19	*.15*	2.86	*.17*	-5.95	*<.01*	.45	-299
Speeding crash	0.25	*.66*	1.56	*<.01*	0.63	*.20*	0.11	*.87*	-1.19	*.02*	.61	-311
Lung cancer from smoking	-1.07	*.05*	2.82	*<.01*	0.46	*.28*	1.87	*.01*	2.95	*<.01*	.65	-382
Illness from GM foods	-0.92	*.01*	1.89	*<.01*	0.05	*.70*	1.18	*<.01*	-1.29	*<.01*	.77	-281
Low Personal Agency												
Plane crash	0.61	*.33*	0.04	*.95*	0.03	*.94*	-0.29	*.69*	0.53	*.41*	.40	-149
Avian flu from traveling	0.74	*.33*	1.71	*.02*	0.84	*.02*	-0.47	*.56*	-1.37	*.07*	.41	-216
Car breakdown	1.44	*.03*	0.95	*.07*	0.81	*.05*	-1.11	*.12*	-0.55	*.34*	.49	-207
Hard-drive crash	1.13	*<.01*	1.05	*.01*	0.73	*.02*	-0.57	*.18*	-0.86	*.08*	.59	-251

Note. Model (3) was not selected after applying a backward elimination model selection procedure. Model (5) also yielded a lower BIC score than Model (3) (see Table 1).

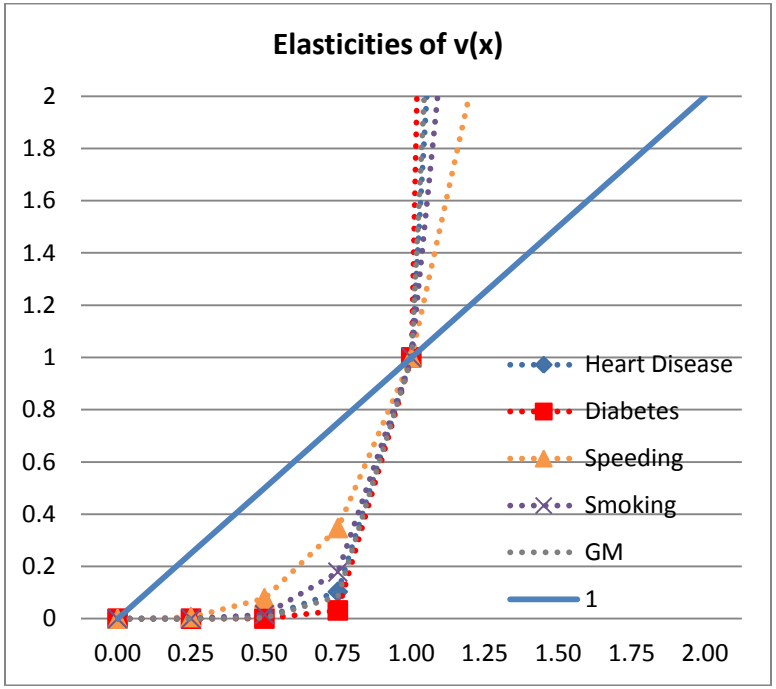
Appendix 9: Results for Regression Model (6) in Experiment 2

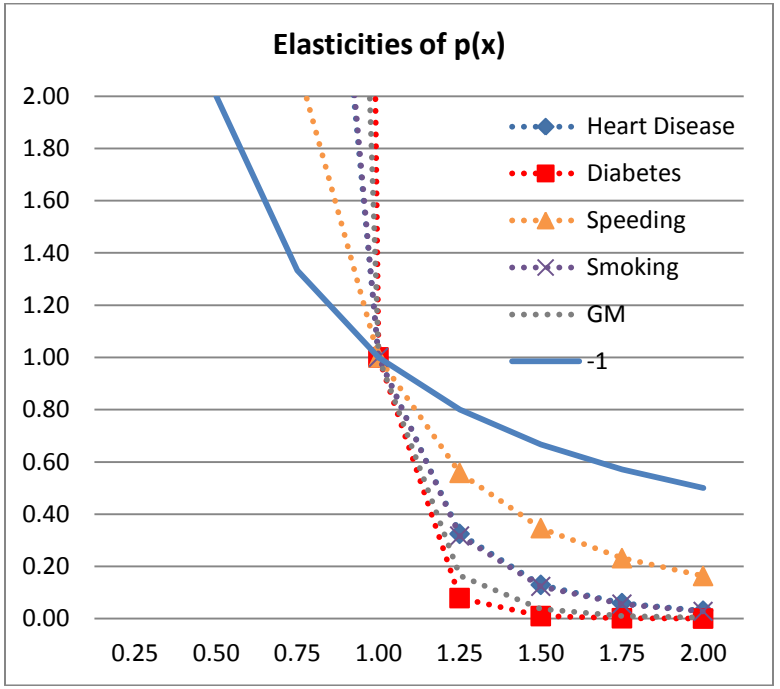
Treatment Condition	Standardized Beta for Predictor in Regression Model (6)											
	Consequence		Probability		δ		Cons*δ		Prob*δ			
	a	sig.	*B*	sig.	*C*	sig.	*d*	sig.	*E*	sig.	adj R^2	BIC of Model (6)
Low SC Condition												
Heart disease from overeating	0.13	*.81*	2.37	*<.01*	-2.28	*.16*	1.31	*.47*	-3.11	*<.01*	.34	-253
Speeding crash	0.26	*.42*	1.17	*<.01*	0.28	*.63*	0.84	*.21*	-1.22	*<.01*	.75	-230
Liver damage from drinking	-0.64	*.08*	1.79	*<.01*	0.09	*.93*	2.11	*.02*	-2.13	*.04*	.46	-291
Lung cancer from smoking	-0.48	*.99*	1.58	*<.01*	-0.17	*.87*	2.74	*<.01*	-3.09	*<.01*	.61	-283
High SC Condition												
Heart disease from overeating	0.33	*.25*	0.56	*.06*	0.81	*.61*	-0.55	*.67*	-0.29	*.82*	.25	-342
Speeding crash	-0.26	*.42*	0.14	*.61*	-1.65	*.08*	1.03	*.25*	0.85	*.17*	.26	-222
Liver damage from drinking	0.38	*.26*	0.47	*.11*	-0.17	*.82*	-0.24	*.74*	0.002	*.99*	.32	-314
Lung cancer from smoking	-0.10	*.69*	0.69	*.02*	-0.39	*.64*	0.48	*.42*	-0.02	*.98*	.45	-331

δ represents the dummy variable for self-control condition.

Note. Model (6) was not selected after applying a backward elimination model selection procedure. Model (8) also yielded a lower BIC score than Model (6) (see Table 2).

Appendix 10: Overall Elasticities for Experiment 1





	α	β
Heart disease from overeating	7.902	-5.042
Diabetes from overeating	12.022	-11.388
Speeding crash	3.682	-2.614
Lung cancer from smoking	5.994	-5.156
GM Foods	8.588	-8.072

*α and β are the overall weights for $v(x)$ and $p(x)$, respectively in the power function Model (5), where $\alpha = a + d$*ln(SC) and $\beta = b + e$*ln(SC). For illustrative purposes, elasticities are calculated using the lowest SC value of the sample, ln(SC) value = 3.2. Thus, this is the lowest bound for elasticities in the sample. Elasticities for low self-agency risks are not calculated because the interaction parameters were not statistically significant.

Overall, values were convex with respect to increasing risk which suggests increasing sensitivity to risk, i.e., an increase in consequence results in a greater than proportional increase in perceived risk, an increase probability results in a greater than proportional increase in perceived risk.

Appendix 11: Results from Additive Model in Experiment 1

	Standardized Beta for Predictor in Regression Model										
Risk	Consequence		Probability		Cons*SC		Prob*SC			BIC of Model	BIC with SC term
	a	sig.	*B*	sig.	*d*	sig.	*e*	sig.	adj R^2		
High Personal Agency											
Heart disease from overeating	-0.60	*.12*	1.17	*<.01*	0.93	*.05*	0.67	*.11*	.46	92.0	96.7
Diabetes from overeating	-0.82	*.03*	1.86	*<.01*	1.53	*<.01*	-1.55	*<.01*	.56	93.8	98.5
Speeding crash	0.17	*.27*	0.73	*<.01*	0.22	*.33*	-0.16	*.54*	.59	101	105
Lung cancer from smoking	-0.32	*.11*	1.14	*<.01*	1.05	*<.01*	-1.01	*<.01*	.67	49.8	52.4
Illness from GM foods	-0.30	*.08*	1.10	*<.01*	0.72	*<.01*	-0.61	*.01*	.71	70.1	75.0
Low Personal Agency											
Plane crash	0.52	*<.01*	0.21	*.46*	-0.28	*.18*	0.37	*.24*	.34	221	225
Avian flu from traveling	0.01	*0.95*	0.74	*<.01*	0.44	*.10*	-0.32	*.25*	.40	163	167
Car breakdown	0.80	*<.01*	0.19	*.28*	-0.41	*.11*	0.32	*.16*	.55	119	123
Hard-drive crash	.73	*<.01*	0.16	*.41*	-0.26	*.26*	0.27	*.27*	.49	145	149

The same general pattern emerges if we used additive models or risk, but only 7 out of 10 interaction components are significant (which reflects how well it could capture the interaction between SC and the risk components), and BIC scores are higher.

However, consistent with multiplicative models, BIC values are also smaller when the SC term is not present.

Appendix 12: Results from Additive Model in Experiment 2

	Standardized Beta for Predictor in Regression Model										
Risk	Consequence		Probability		Cons* δ		Prob* δ		adj R^2	BIC of Model	BIC with SC term
	a	sig.	*B*	sig.	*d*	sig.	*e*	sig.			
Low SC Condition											
Heart disease from overeating	-0,17	*.36*	1.00	*<.01*	1.08	*<.01*	-0.77	*.01*	.36	23.1	25.7
Speeding crash	0.09	*.67*	0.70	*<.01*	0.26	*.20*	-0.16	*.47*	.48	45.9	41.3
Liver damage from drinking	-0.04	*.78*	0.87	*<.01*	0.56	*.03*	-0.51	*.07*	.47	-7.01	-2.98
Lung cancer from smoking	0.04	*.70*	0.92	*<.01*	0.56	*.02*	-0.66	*.01*	.60	-1.17	2.96
High SC Condition											
Heart disease from overeating	0.35	*.03*	0.30	*.07*	-0.45	*.42*	0.46	*.42*	.19	14.3	18.6
Speeding crash	0.13	*.41*	0.61	*<.01*	0.08	*.81*	-0.02	*.95*	.40	66.8	70.9
Liver damage from drinking	0.30	*.05*	0.56	*<.01*	0.32	*.93*	-0.10	*.79*	.44	12.1	16.4
Lung cancer from smoking	0.37	*.02*	0.39	*.01*	-0.40	*.22*	0.42	*.20*	.34	14.5	15.6

As in Experiment 1, additive models had worse fit in Experiment 2 as seen by only 5 significant interaction terms (and one marginal term), and higher BIC terms.

However, consistent with multiplicative models, BIC values are also smaller when the SC term is not present, with the exception of Speeding Crash in the Low SC condition.

Appendix 13: Temporal Framing of Risk Scenarios in Experiment 5.

Control Information	Temporally Proximate Scenario	Temporally Distant Scenario
Becoming overweight from overeating can result in numerous health risks. Imagine that you are at risk and are considering ways to mitigate the health risks associated with being overweight. You are considering two options:	Becoming overweight from overeating can result in numerous health risks. Imagine you are visiting some close relatives for a two week trip. Imagine that your relatives are known to be serious cooks who have a habit of over-stuffing you with a lot of super tasty but less-than-healthy food. It's always hard to say no to them, so you are worried about gaining a lot of weight during your trip. This trip is happening in one week's time, Imagine that you are considering ways to mitigate the health risks associated with becoming overweight after your trip. You are considering two options to adopt after you get back:	Becoming overweight from overeating can result in numerous health risks. Imagine you are visiting some close relatives for a two week trip. Imagine that your relatives are known to be serious cooks who have a habit of over-stuffing you with a lot of super tasty but less-than-healthy food. It's always hard to say no to them, so you are worried about gaining a lot of weight during your trip. This trip is happening in 6 months time. Imagine that you are considering ways to mitigate the health risks associated with becoming overweight after your trip. You are considering two options to adopt after you get back:
Smoking has been shown to cause a wide range of health problems including lung disease. Imagine that you are a regular smoker and are considering two ways in which you can reduce the health risks associated with smoking.	Smoking has been shown to cause a wide range of health problems including lung disease. Imagine that you are a smoker and are going to a close friend's birthday party next week which is held at a cigar lounge, where you will probably not be able to avoid smoking numerous celebratory cigars (which have 10-times greater health impact than ordinary cigarettes). You are considering two ways in which you can reduce the health risks associated with smoking:	Smoking has been shown to cause a wide range of health problems including lung disease. Imagine that you are a smoker and are going to a close friend's birthday party in 6 months time which is held at a cigar lounge, where you will probably not be able to avoid smoking numerous celebratory cigars (which have 10-times greater health impact than ordinary cigarettes). You are considering two ways in which you can reduce the health risks associated with smoking:
Imagine that your doctor feels that you have bad sitting posture that could lead to serious long term back damage. Your doctor suggests two ways you can reduce the risk of back damage from poor posture:	Imagine that your doctor feels that you have bad sitting posture that could lead to serious long term back damage. Imagine that you are working at a firm that is sending you to a two-week-long re-training seminar which basically involves sitting down in uncomfortable classroom chairs for 12 hours a day. You are worried about the effect of sitting down too much on your back. You are going to this training seminar next week. Your doctor suggests two ways you can reduce the risk of back damage from poor posture:	Imagine that your doctor feels that you have bad sitting posture that could lead to serious long term back damage. Imagine that you are working at a firm that is sending you to a two-week-long re-training seminar which basically involves sitting down in uncomfortable classroom chairs for 12 hours a day. You are worried about the effect of sitting down too much on your back. You are going to this training seminar in 6 months time. Your doctor suggests two ways you can reduce the risk of back damage from poor posture:

In the temporally proximate (distant) scenario, participants are also told that they will be exposed to the risk to a significant degree in one week (6 months). In the control condition, only general information about being at risk is given.

Appendix 14: Holt-Laury Risk Aversion Task in Experiment 6

Gambles

The questions below present choices between pairs of gambles.

Each gamble is based on the roll of a 10-sided die. To make things simple, we simply present to you the chances of winning one amount or another amount.

For each pair of gambles, please pick one (left or right) that is more attractive to you (e.g. if you were given a chance to participate in one at a casino, which one would you bet on).

E.g., Gamble 1) Which gamble do you prefer (the left gamble or the right gamble)?

Explanation:

- Left choice = a gamble where you have a 10% chance of winning $2.00 and a 90% chance of winning $1.60
- Right choice = a gamble where you have a 10% chance of winning $3.85 and a 90% chance of winning $0.10

Gamble 1	10% chance of $2.00, 90% chance of $1.60	10% chance of $3.85, 90% chance of $0.10
Gamble 2	20% chance of $2.00, 80% chance of $1.60	20% chance of $3.85, 80% chance of $0.10
Gamble 3	30% chance of $2.00, 70% chance of $1.60	30% chance of $3.85, 70% chance of $0.10
Gamble 4	40% chance of $2.00, 60% chance of $1.60	40% chance of $3.85, 60% chance of $0.10
Gamble 5	50% chance of $2.00, 50% chance of $1.60	50% chance of $3.85, 50% chance of $0.10
Gamble 6	60% chance of $2.00, 40% chance of $1.60	60% chance of $3.85, 40% chance of $0.10
Gamble 7	70% chance of $2.00, 30% chance of $1.60	70% chance of $3.85, 30% chance of $0.10
Gamble 8	80% chance of $2.00, 20% chance of $1.60	80% chance of $3.85, 20% chance of $0.10
Gamble 9	90% chance of $2.00, 10% chance of $1.60	90% chance of $3.85, 10% chance of $0.10
Gamble 10	100% chance of $2.00, 0% chance of $1.60	100% chance of $3.85, 0% chance of $0.10