

Supplementary Material for:

**Affect-driven impulsivity impairs human action control and selection, as measured
through Pavlovian instrumental transfer and outcome devaluation**

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Supplementary Material A

Composition of the battery of questionnaires answered online by participants in Experiments
1 and 2.

As part of a wider unrelated research project aimed at studying several variables related to eating styles and personality traits, participants responded to a battery that was composed of, in addition to the UPPS-P, the following questionnaires or items: Spanish Revised Restraint Scale; Power of Food Scale, PFS, translated to Spanish by one of the authors and one English (American) native speaker; Spanish Version of the Shortened Sensitivity to Punishment and Sensitivity to Reward Questionnaire SPSRQ-20; Spanish Version of the Three-Factor Eating Questionnaire-R18; Item 26 of the Spanish Version of the Yale Food Addiction Inventory Scale, YFAS-S, and the three items of the Perceived Self-Regulatory Success measure applied to dieting, translated to Spanish by one of the authors and one English (American) native speaker. Participants responded online before being invited to participate in the experimental task of the present study.

Supplementary Material B

Instructions of Experiments 1 and 2 (Translated from Spanish; original instructions are available upon request)

Experiments 1 and 2 (Instrumental and Pavlovian training were identical)

Instrumental training:

‘You form part of a group whose aim is to obtain goodies to help impoverished children to celebrate their birthday parties. Each piece of food obtained will be of great utility. There is a rumour saying that it is possible to get free snacks from a vending machine. Press Key B in order to tilt the machine to the left, and Key N to tilt the machine to the right. Use only the pointing finger of your dominant hand. Tilt the machine until a product falls. You have to learn which snack falls when you tilt the machine to the right and which one falls when you tilt it to the left. Occasionally a question about this relationship will appear in order to check your knowledge about it. Press the space bar to continue’.

Pavlovian training:

‘Your group has discovered that, when the machines are completely full of products, it is easier for products to fall freely. The lights on the front panel of the machine will signal when the machine is too full. You should just observe and pay attention in order to learn how the colours of the lights are related to each product. Again, you will occasionally be asked about these relationships. Use the keyboard [keys a, b, c, d] in order to select the correct answer. Press the space bar to continue’.

Experiment 1 (PIT first, devaluation afterwards)

Pavlovian-to-instrumental transfer

‘Now you and your group are going to be tested about the knowledge you have acquired so far. The aim of this phase is to optimize the process before going to the street to obtain products. Remember that you will be able to get them by tilting the machine to the left (Key B) or the right (Key N) in the way that you learnt in the first phase. Again, use only your dominant hand. Depending on the key you press, you will get one product or the other. However, in this phase you will not see images on the screen, although your task is still to obtain as many snacks as you can in the most efficient way. Additionally, consider the colour that the machine occasionally shows because this will give you a clue about which product is more likely to fall in a given time, as you learnt during the second phase. In summary, press keys ‘B’ and ‘N’ during the task in order to get products, as you did during the first phase. Likewise, take into account the colours that will occasionally light up in the machine in order to know which product is more likely to fall, according to what you have learned during the second phase. Finally, note that the task will last for approximately 7 minutes. Use this time to gain as many products as you can so the impoverished children can have the best birthday party of their lives. Press the space bar to continue’.

Outcome Devaluation

‘Congratulations, you have successfully passed the test and are now on the street with your group trying to get goodies for the impoverished children. You and your group are in an area with plenty of vending machines, thus it looks like a good place to start. However, one of you has discovered that the machines are infested! Disgusting insects have invaded some of the snack packages. When you tilt the machine, one of the products will be shared with these new inhabitants. Not all the snack packages, but half of them. Next you can see an image

showing an instance of the state of half of the packages of that specific product. Pay close attention during the time the image is presented.

(After watching the image)

This is really a problem because, on the one hand, you need to get as many products as you can and, on the other, half of the packages of one of the products are infested with the insects. Remember that you will keep getting snacks by tilting the machine to the left (Key B) or to the right (Key N), as you learnt during the first phase. Again, use only the pointing finger of your dominant hand. Depending on which key you press, you will get one product or the other. However, in this phase you will not see the images of the products on the screen, although your task is still to obtain as many products as you can in the most efficient way. Go ahead, press the space bar to continue and get goodies for the impoverished children’.

Experiment 2 (Devaluation first, PIT afterwards)

‘Congratulations, you have successfully passed the test and are now on the street with your group trying to get goodies for the impoverished children. You and your group are in an area with plenty of vending machines, thus it looks like a good place to start. However, one of you has discovered that the machines are infested! Disgusting insects have invaded some of the snack packages. When you tilt the machine, one of the products will be shared with these new inhabitants. No all the snack packages, but half of them. Next you can see one image showing an instance of the state of half of the packages of that specific product. Pay close attention during the time the image is presented.

(After watching the image)

This is really a problem because, on the one hand, you need to get as many products as you can and, on the other, half of the packages of one of the products are infested with the insects.

Now you get snacks by tilting the machine to the left (Key B) or to the right (Key N), as you learnt during the first phase. Again, use only the pointing finger of your dominant hand. Depending on which key you press, you will get one product or the other. However, in this phase you will not see the images of the products on the screen, although your task is still to obtain as many products as you can in the most efficient way. Depending on the key you press, you will get one product or another. Additionally, consider the colour that the machine occasionally shows because this will give you a clue about which product is more likely to fall in a given time, as you learnt during the second phase.

In summary, press the keys 'B' and 'N' during the task in order to get products, as you did during the first phase. Likewise, take into account the colours that will occasionally light up in the machine in order to know which product is more likely to fall, according to what you learned during the second phase.

Finally, note that the task will last for approximately 7 minutes. Use this time to gain as many products as you can so the impoverished children may have the best birthday party of their lives. Press the space bar to continue'.