**Supplementary Table 1: PRISMA CHECKLIST**

| Section/topic | # | Checklist item | Reported on page # |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a systematic review, meta-analysis, or both. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number. | 1 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. | 1-2-3 |
| Objectives | 4 | Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS). | 2-3 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number. | NA |
| Eligibility criteria | 6 | Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale. | 3 |
| Information sources | 7 | Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched. | 3 |
| Search | 8 | Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated. | 3 |
| Study selection | 9 | State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis). | 3 |
| Data collection process | 10 | Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators. | 3 |
| Data items | 11 | List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made. | 3 |

| | | | |
|---|---|---|---|
| Risk of bias in individual studies | 12 | Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis. | 3-4 |
| Summary measures | 13 | State the principal summary measures (e.g., risk ratio, difference in means). | 3-4 |
| Synthesis of results | 14 | Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., $I^2$) for each meta-analysis. | 3-4 |



| Section/topic | # | Checklist item | Reported on page # |
|---|---|---|---|
| Risk of bias across studies | 15 | Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies). | 4-5 |
| Additional analyses | 16 | Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified. | 4-5 |
| **RESULTS** | | | |
| Study selection | 17 | Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram. | 7-8-9 |
| Study characteristics | 18 | For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations. | 6 |
| Risk of bias within studies | 19 | Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12). | NA |
| Results of individual studies | 20 | For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot. | 7-8-9-10 |
| Synthesis of results | 21 | Present results of each meta-analysis done, including confidence intervals and measures of consistency. | 7-8-9-10, Supp T2 to T6 |
| Risk of bias across studies | 22 | Present results of any assessment of risk of bias across studies (see Item 15). | 8-9, Supp T2, Supp T6 |
| Additional analysis | 23 | Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]). | Supp T2 to T6 |
| **DISCUSSION** | | | |
| Summary of evidence | 24 | Summarize the main findings including the strength of evidence for each main outcome; consider their | 10-11 |

| | | | |
|---|---|---|---|
| | | relevance to key groups (e.g., healthcare providers, users, and policy makers). | |
| Limitations | 25 | Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias). | 12 |
| Conclusions | 26 | Provide a general interpretation of the results in the context of other evidence, and implications for future research. | 12 |
| **FUNDING** | | | |
| Funding | 27 | Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review. | NA |

*From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

## Supplementary Table 2: Increased activations of the striato-insular cluster after exclusion of the outlier (n=34)

| | SDM z-value[(a)] | *P* Value[(b)] | No. of voxels[(c)] | Breakdown (No. of voxels)[(c)] |
|---|---|---|---|---|
| Left Caudate nucleus | 7.114 | ~0 | 10030 | Bilateral Anterior thalamic projections (1253)<br>Bilateral Insula (1234)<br>Bilateral Striatum (1231)<br>Bilateral BA 48 (811)<br>Bilateral Putamen (723)<br>Bilateral Caudate Nucleus (575)<br>Bilateral Thalamus (565)<br>Bilateral BA 25 (328)<br>Bilateral BA 47 (315)<br>Corpus callosum (225)<br>Bilateral BA 45 (221)<br>Bilateral BA 11 (203)<br>Bilateral amygdala (121)<br>Bilateral BA 34 (101)<br>Anterior commissure (104) |

*Note.* BA = Brodmann Area; SDM = Seed-based d Mapping;
(a) Voxel probability threshold: p = 0.005
(b) Peak height threshold: z = 1
(c) Cluster extent threshold: 100 voxels. Regions with less than 10 voxels are not reported in the cluster breakdown.

**Supplementary Table 3.** Increased activations during anticipation of monetary loss: robustness analyses

| | Increased activations during loss anticipation | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Left lenticular nucleus (Pallidum) | Left median cingulate / paracingulate gyri | Left precentral gyrus | Left Cereb Hemis. lobule VI | Right Lingual Gyrus | Right Cereb., Hemis. lobule VI | Left lingual gyrus | Right middle frontal gyrus |
| Jackknife analysis | | | | | | | | |
| All studies but Balodis *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Bayer *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Beck *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| All studies but Bjork *et al. 2004* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Bjork *et al. 2008* | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| All studies but Bjork *et al. 2010* | Yes | Yes | Yes | Yes | No | No | No | No |
| All studies but Bustamante *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Cho *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| All studies but Cooper *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Dillon *et al.* | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| All studies but Enzi *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| All studies but Hahn *et al.* | Yes | Yes | Yes | Yes | Yes | No | No | No |
| All studies but Herbort *et al.* | Yes | Yes | Yes | Yes | Yes | No | Yes | No |
| All studies but Juckel *et al.2006* | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| All studies but Juckel *et al.2012* | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| All studies but Kaufmann *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| All studies but Kirk *et al.* | Yes | Yes | Yes | Yes | No | No | Yes | Yes |
| All studies but Knutson *et al.2001* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| All studies but Knutson *et al.2003* | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| All studies but Knutson *et al.2008* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Kocsel *et al* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Pfabigan *et al.* | Yes | Yes | Yes | Yes | Yes | No | No | No |
| All studies but Romanczuk *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Samanez-Larkin *et al.(1)* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Samanez-Larkin *et al.(2)* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| All studies but Schlagenhauf *et al. 2008* | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| All studies but Schlagenhauf *et al. 2009* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Stoy *et al. 2011* | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes |
| All studies but Stoy *et al. 2012* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Treadway *et al.* | Yes | Yes | Yes | Yes | No | No | Yes | Yes |
| All studies but Ubl *et al.* | Yes | Yes | Yes | Yes | Yes | No | Yes | No |
| All studies but Van Duin *et al* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| All studies but Wrase *et al. 2007a* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Wrase *et al. 2007b* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| All studies but Wu *et al.* | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| | 35 out of 35 | 35 out of 35 | 35 out of 35 | 35 out of 35 | 32 out of 35 | 24 out of 35 | 26 out of 35 | 24 out of 35 |

**Supplementary Table 4:** Increased activations during anticipation of monetary loss: magnet intensity (tesla)

| | *MNI* Coordinates | SDM z-value[(a)] | *P* Value[(b)] | No. of voxels[(c)] | Breakdown (No. of voxels) [(c)] |
|---|---|---|---|---|---|
| ***Comparisons*** | | | | | |
| 3 < 1.5T scanners | | | | | |
| Right inferior frontal gyrus operc. Part. | 42,12,12 | 2.238 | 0.00037 | 1062 | R BA 48 (441)<br>R insula (201)<br>R BA 38 (130)<br>R BA 21 (25)<br>Corpus callosum (27) |
| Left inferior frontal gyrus, Opercular Part. | -50,14,16 | 2.068 | 0.00077 | 297 | L BA 48 (103)<br>L BA 44 (85)<br>L BA 6 (51) |
| 3 > 1.5T scanners | | | | | |
| Left cerebellum, hemispheric lobule VI | -28,-70,-22 | 2.859 | 0.00015 | 1295 | L cerebellum, hemispheric lobule VI (581)<br>L cerebellum, crus I (367)<br>L fusiform gyrus (200) |
| Left thalamus | -10,-14,4 | 3.58 | 0.000005 | 350 | L anterior thalamic (301)<br>L pons (19)<br>Corpus callosum (16) |

*Note.* BA = Brodmann Area; SDM = Seed-based d Mapping; (a) Voxel probability threshold: p = 0.0005; (b) Peak height threshold: z=1; (c) Cluster extent threshold: 100 voxels. Regions with less than 10 voxels are not reported in the cluster breakdown.

**Supplementary Table 5:** Increased activations during anticipation of monetary loss: comparisons full width at half maximum (FWHM) of the smoothing kernel.

| | *MNI* Coordinates | SDM z-value[(a)] | *P* Value[(b)] | No. of voxels[(c)] | Breakdown (No. of voxels) [(c)] |
|---|---|---|---|---|---|
| ***Comparisons*** | | | | | |
| 8 < 4 mm FWHM | | | | | |
| Right insula | 26,14,-16 | 3.819 | ~0 | 186 | R frontal orbito-polar tract (46)<br>R BA 11 (72)<br>R Insula (16)<br>R BA 48 (14) |
| 8 > 4 mm FWHM | | | | | |
| Left lingual gyrus | -6,-84,2 | 2.25 | ~0 | 512 | L BA 17 (155)<br>Corpus callosum (98)<br>R BA 17 (63)<br>L BA 18 (56) |
| Left thalamus | -10,-12,8 | 2.14 | 0.000005 | 120 | L anterior thalamic (119) |

*Note.* BA = Brodmann Area; SDM = Seed-based d Mapping.
(a) Voxel probability threshold: p = 0.0005
(b) Peak height threshold: z = 1
(c) Cluster extent threshold: 100 voxels. Regions with less than 10 voxels are not reported in the cluster breakdown.

**Supplementary Table 6:** Increased activations during loss anticipation: meta-regression on age

| | *MNI* Coordinates | SDM z-value[a] | *P* Value[b] | No. of voxels[c] | Breakdown (No. of voxels) [c] |
|---|---|---|---|---|---|
| ***Effects of Age*** | | | | | |
| <u>Younger < Older</u> | | | | | |
| Left inferior frontal gyrus, opercular part | -54,8,22 | 2.62 | 0.0011 | 190 | L BA 44 (89)<br>L BA 6 (65) |
| L Median cingulate | -8,-30,26 | 2.826 | 0.00057 | 182 | L posterior cingulate gyrus (76)<br>L median network, cingulum (53)<br>Corpus callosum (45) |
| <u>Younger > Older</u> | | | | | |
| Left anterior cingulate/ paracingulate gyri | -8,24,30 | 2.247 | 0.00019 | 941 | Bilateral anterior cingulate/paracingulate gyri (425)<br>Bilateral median cingulate/paracingulate gyri (333)<br>L superior frontal gyrus (155) |
| Right olfactory cortex | 2,12,-4 | 2.748 | ~0 | 611 | Bilateral striatum (199)<br>Bilateral BA 25 (191)<br>R anterior thalamic projections (79) |
| Left thalamus | -14,-24,-2 | 2.589 | ~0 | 550 | L thalamic projections (376)<br>L pons (38) |
| Right lingual gyrus | 12,-58,-4 | 2.085 | 0.00048 | 182 | R BA 18 (110)<br>R BA 19 (44) |

*Note*. BA = Brodmann Area; SDM = Seed-based d Mapping.
(a) Voxel probability threshold: p = 0.005
(b) Peak height threshold: z = 1
(c) Cluster extent threshold: 100 voxels. Regions with less than 10 voxels are not reported in the cluster breakdown.

**Supplementary Table 7:** Increased activations during anticipation of monetary loss: meta-regression on repetition time (TR)

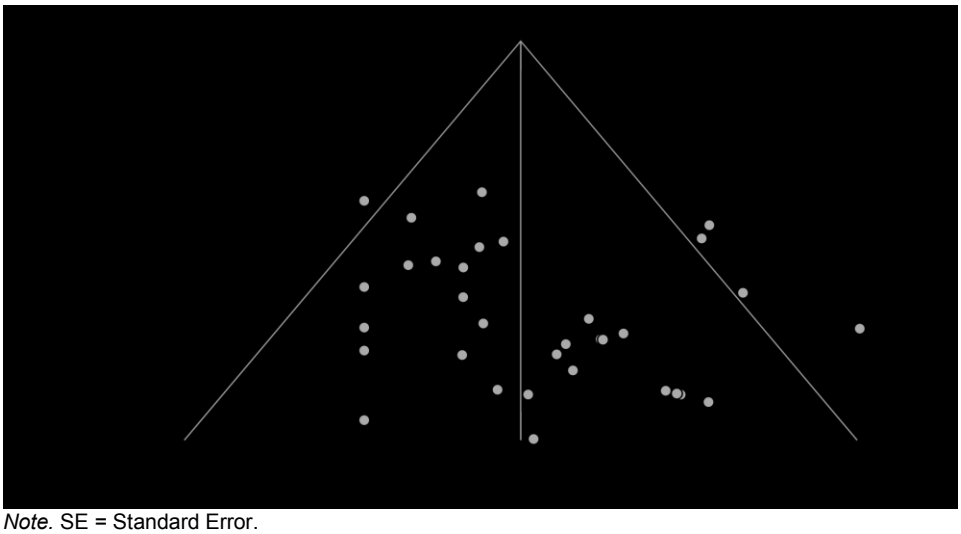
| | *MNI* Coordinates | SDM z-value[(a)] | *P* Value[(b)] | No. of voxels[(c)] | Breakdown (No. of voxels) [(c)] |
|---|---|---|---|---|---|
| ***Effects of TR*** | | | | | |
| Shortest TR < Longest TR | | | | | |
| - | | | | | |
| Shortest TR > Longest TR | | | | | |
| Lingual Gyrus | 0,-88,4 | -2.991 | 0.00005 | 461 | L BA 17 (195)<br>L BA 18 (96)<br>Corpus Callosum (90) |
| Cerebellum, vermic lobule VI | 6,-78,-16 | -2.601 | 0.0003 | 297 | BA 18 (168)<br>BA 17 (50) |

*Note.* BA = Brodmann Area; SDM = Seed-Based d Mapping
(a) Voxel probability threshold: p = 0.005
(b) Peak height threshold: z = 1
(c) Cluster extent threshold: 100 voxels. Regions with less than 10 voxels are not reported in the cluster breakdown.

**Supplementary Table 8.** Increased activations during loss outcome: robustness analyses.

| | Increased activations during monetary loss outcome | | |
|---|---|---|---|
| | Right striatum | Left anterior cingulate / paracingulate gyri | Left striatum |
| Jackknife analysis | | | |
| All studies but Balodis *et al.* | Yes | Yes | Yes |
| All studies but Beck *et al.* | Yes | Yes | Yes |
| All studies but Bjork *et al. 2004* | Yes | Yes | Yes |
| All studies but Bjork *et al. 2010* | Yes | Yes | Yes |
| All studies but Cooper *et al.* | Yes | Yes | Yes |
| All studies but Dillon *et al.* | Yes | Yes | Yes |
| All studies but Kirk *et al.* | Yes | Yes | Yes |
| All studies but Knutson *et al.2008* | Yes | Yes | Yes |
| All studies but Kocsel *et al* | Yes | Yes | Yes |
| All studies but Romanczuk *et al.* | Yes | Yes | Yes |
| All studies but Samanez-Larkin *et al.(1)* | Yes | Yes | Yes |
| All studies but Samanez-Larkin *et al.(2)* | Yes | Yes | Yes |
| All studies but Schlagenhauf *et al. 2009* | Yes | Yes | Yes |
| All studies but Treadway *et al.* | Yes | Yes | Yes |
| All studies but Ubl *et al.* | Yes | Yes | Yes |
| All studies but Wu *et al.* | Yes | Yes | Yes |
| | 16 out of 16 | 16 out of 16 | 16 out of 16 |

**Supplementary Figure 1.** Funnel plot of the striato-insular cluster in the anticipation of loss condition (n=34).



*Note.* SE = Standard Error.