



Universiteit
Leiden
The Netherlands

Adolescent risk taking : the influence of pubertal development, neural responses to rewards and social context

Braams, B.R.

Citation

Braams, B. R. (2015, November 17). *Adolescent risk taking : the influence of pubertal development, neural responses to rewards and social context*. Retrieved from <https://hdl.handle.net/1887/36352>

Version: Corrected Publisher's Version

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/36352>

Note: To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The handle <http://hdl.handle.net/1887/36352> holds various files of this Leiden University dissertation

Author: Braams, Barbara

Title: Adolescent risk taking : the influence of pubertal development, neural responses to rewards and social context

Issue Date: 2015-11-17

References

A

- Akaike H (1974). New look at statistical-model identification. *IEEE Trans Automat Contr*, 19, 716-723.
- Aknin, L.B., Sandstrom, G.M., Dunn, E.W., Norton, M.I. (2011). It's the recipient that counts: spending money on strong social ties leads to greater happiness than spending on weak social ties. *PLoS One*, 6(2), e17018.
- Ames, S. L., Grenard, J. L., Thush, C., Sussman, S., Wiers, R. W., & Stacy, A. W. (2007). Comparison of indirect assessments of association as predictors of marijuana use among at-risk adolescents. *Experimental and Clinical Psychopharmacology*, 15(2), 204-218.
- Amodio, D.M., Frith, C.D. (2006). Meeting of minds: the medial frontal cortex and social cognition. *Nature Reviews Neuroscience*, 7(4), 268-77.
- Apicella, C. L., Carré, J. M., & Dreber, A. (2014). Testosterone and Economic Risk Taking: A Review. *Adaptive Human Behavior and Physiology*, 1-28.
- Aue, T. (2014). I feel good whether my friends win or my foes lose: Brain mechanisms underlying feeling similarity. *Neuropsychologia*, 60, 159-167.

B

- Beaver, J.D., Lawrence, A.D., van Ditzhuijzen, J., Davis, M.H., Woods, A., Calder, A.J. (2006). Individual differences in reward drive predict neural responses to images of food. *Journal of Neuroscience*, 26, 5160-5166.
- Bennett, C. M., & Miller, M. B. (2013). fMRI reliability: Influences of task and experimental design. *Cognitive Affective & Behavioral Neuroscience*, 13(4), 690-702.
- Beyth-Marom, R., & Fischhoff, B. (1997). Adolescents decisions about risks: a cognitive perspective. In J. Schulenberg & J. L. Maggs (Eds.), *Health Risks and Developmental Transitions in Adolescence*. New York, NY: Cambridge University Press.
- Bjork, J.M., Knutson, B., Fong, G.W., Caggiano, D.M., Bennett, S.M., Hommer, D.W. (2004). Incentive-elicited brain activation in adolescents: similarities and differences from young adults. *Journal of Neuroscience*, 24(8), 1793-1802.
- Bjork, J.M., Smith, A.R., Chen, G., Hommer, D.W. (2010). Adolescents, adults and rewards: comparing motivational neurocircuitry recruitment using fMRI. *PLoS One*, 5(7), e11440.
- Blakemore, S.J. (2008). The social brain in adolescence. *Nature Reviews Neuroscience*, 9(4), 267-277.
- Blakemore, S. J., Burnett, S., & Dahl, R. E. (2010). The role of puberty in the developing adolescent brain. *Human Brain Mapping*, 31(6), 926-933.
- Blakemore, S.J., den Ouden, H., Choudhury, S., Frith, C. (2007). Adolescent development of the neural circuitry for thinking about intentions. *Social Cognitive and Affective Neuroscience*, 2(2), 130-139.
- Blakemore, S. J., & Robbins, T. W. (2012). Decision-making in the adolescent brain. *Nature Neuroscience*, 15(9), 1184-1191.
- Bowker, A. (2004). Predicting friendship stability during early adolescence. *Journal of Early Adolescence*, 24(2), 85-112.
- Boyer, T. W. (2006). The development of risk taking: A multi-perspective review. *Developmental Review*, 26(3), 291-345.
- Braams, B.R., Güroğlu, B., de Water, E., Meuwese, R., Koolschijn, P.C.M.P., Peper, J.S., Crone, E. (2013). Reward-related neural responses are dependent on the beneficiary. *Social Cognitive and Affective Neuroscience*, nst077.

- Braams, B.R., Peters, S., Peper, J.S., Güroğlu, B., Crone, E.A. (2014). Gambling for self, friends, and antagonists: differential contributions of affective and social brain regions on adolescent reward processing. *NeuroImage*, 100, 281-289.
- Braams, B.R., Van Leijenhorst, L., Crone, E.A. (2014). Risks, rewards, and the developing brain in childhood and adolescence. In: Reyna, V.F., Zayas, V. (Eds.), *The neuroscience of risky decision making*. American Psychological Association, Washington DC, pp. 73-91.
- Brener, N. D., Kann, L., McManus, T., Kinchen, S. A., Sundberg, E. C., & Ross, J. G. (2002). Reliability of the 1999 Youth Risk Behavior Survey questionnaire. *Journal of Adolescent Health*, 31(4), 336-342.
- Brett, M., Anton, J.L., Valabregue, R., Poline, J.B. (2002). Region of interest analysis using an SPM toolbox. *NeuroImage*, 16(2), 497.
- Bukowski, W.M., Hoza, B., Boivin, M. (1994). Measuring friendship quality during pre-adolescence and early adolescence — the development and psychometric properties of the friendship qualities scale. *J. Soc. Pers. Relat.* 11 (3), 471-484.
- Burnett, S., Bird, G., Moll, J., Frith, C., Blakemore, S.J. (2009). Development during adolescence of the neural processing of social emotion. *Journal of Cognitive Neuroscience*, 21(9), 1736-1750.
- Burnett S, Bault N, Coricelli G, Blakemore SJ (2010). Adolescents' heightened risk-seeking in a probabilistic gambling task. *Cognitive Development*, 25, 183-196.
- Burnett, S., Sebastian, C., Kadosh, K. C., & Blakemore, S. J. (2011). The social brain in adolescence: Evidence from functional magnetic resonance imaging and behavioural studies. *Neuroscience and Biobehavioral Reviews*, 35(8), 1654-1664.

C

- Carter, R. M., & Huettel, S. A. (2013). A nexus model of the temporal-parietal junction. *Trends in Cognitive Sciences*, 17(7), 328-336.
- Carskadon, M.A., Acebo, C. (1993). A self-administered rating scale for pubertal development. *Journal of Adolescent Health*, 14, 190-195.
- Carver, C.S., White, T.L. (1994). Behavioral-inhibition, behavioral activation, and affective responses to impending reward and punishment: the BIS/ BAS scales. *Journal of Personality and Social Psychology*, 67, 319-333.
- Cavanna, A. E., & Trimble, M. R. (2006). The precuneus: a review of its functional anatomy and behavioural correlates. *Brain*, 129, 564-583.
- Chein, J., Albert, D., O'Brien, L., Uckert, K., Steinberg, L. (2011). Peers increase adolescent risk taking by enhancing activity in the brain's reward circuitry. *Developmental Science*, 14(2), F1-10.
- Christakou, A., Brammer, M., & Rubia, K. (2011). Maturation of limbic corticostriatal activation and connectivity associated with developmental changes in temporal discounting. *Neuroimage*, 54(2), 1344-1354.
- Cicchetti, D. V., & Sparrow, S. A. (1981). Developing Criteria for Establishing Interrater Reliability of Specific Items -Applications to Assessment of Adaptive-Behavior. *American Journal of Mental Deficiency*, 86(2), 127-137.
- Cillessen, A. H. (2007). New perspectives on social networks in the study of peer relations. *New directions for child and adolescent development*, 2007(118), 91-100.
- Cocosco, R.A., Kollokian, V., Kwan, R.K.S., Evans, A.C. (1997). Brain web: online interface to a 3D MRI simulated brain database. *NeuroImage*, 5, S452.
- Collado-Rodriguez, A., MacPherson, L., Kurdziel, G., Rosenberg, L.A., Lejuez, C.W. (2014). The relationship between puberty and risk taking in the real world and in the laboratory. *Personality and Individual Differences*, 68, 143-148.

- Costumero, V., Barro's-Loscertales, A., Bustamante, J.C., Ventura-Campos, N., Fuentes, P., Rosell-Negre, P., Avila, C. (2013). Reward sensitivity is associated with brain activity during erotic stimulus processing. *PloS One*, 8, e66940.
- Crocetti, E., Rubini, M., Branje, S., Koot, H. M., & Meeus, W. (2015). Self-Concept clarity in adolescents and parents: A six-wave longitudinal and multi-informant study on development and intergenerational transmission. *Journal of Personality*.
- Crone, E. A. (2013). Considerations of Fairness in the Adolescent Brain. *Child Development Perspectives*, 7(2), 97-103.
- Crone, E.A., Dahl, R.E. (2012). Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature Reviews Neuroscience*, 13(9), 636-650.
- Crone, E. A., & Elzinga, B. M. (2015). Changing brains: how longitudinal functional magnetic resonance imaging studies can inform us about cognitive and social-affective growth trajectories. *Wiley Interdisciplinary Reviews: Cognitive Science*, 6(1), 53-63.

D

- D'Argembeau, A., & Salmon, E. (2012). The Neural Basis of Semantic and Episodic Forms of Self-Knowledge: Insights from Functional Neuroimaging. *Sensing in Nature*, 739, 276-290.
- Dahl, R.E. (2004). Adolescent brain development: a period of vulnerabilities and opportunities. *Annals of the New York Academy of Sciences*, 1021, 1-22.
- Dale, A.M. (1999). Optimal experimental design for event-related fMRI. *Human Brain Mapping*, 8(2-3), 109-14.
- Davis, M. H. (1983). Measuring Individual-Differences in Empathy -Evidence for a Multidimensional Approach. *Journal of Personality and Social Psychology*, 44(1), 113-126.
- De Bruijn, E.R., de Lange, F.P., von Cramon, D.Y., Ullsperger, M. (2009). When errors are rewarding. *Journal of Neuroscience*, 29(39), 12183-12186.
- De Water, E., Braams, B.R., Crone, E.A., Peper, J.S. (2013). Pubertal maturation and sex steroids are related to alcohol use in adolescents. *Hormones and Behavior*, 63, 392-397.
- Defoe, I.N., Dubas, J.S., Figner, B., van Aken, M.A. (2015). A meta-analysis on age differences in risky decision making: adolescents versus children and adults. *Psychological Bulletin*, 141, 48 -84.
- Delgado, M.R. (2007). Reward-related responses in the human striatum. *Annals of the New York Academy of Sciences*, 1104, 70-88.
- Delgado, M.R., Locke, H.M., Stenger, V.A., Fiez, J.A. (2003). Dorsal striatum responses to reward and punishment: effects of valence and magnitude manipulations. *Cognitive, Affective & Behavioral Neuroscience*, 3(1), 27-38.
- Delgado, M.R., Frank, R.H., Phelps, E.A. (2005). Perceptions of moral character modulate the neural systems of reward during the trust game. *Nature Neuroscience*, 8(11), 1611-8.
- Denny, B.T., Kober, H., Wager, T.D., Ochsner, K.N. (2012). A meta-analysis of functional neuroimaging studies of self-and other judgments reveals a spatial gradient for mentalizing in medial prefrontal cortex. *Journal of Cognitive Neuroscience*, 24(8), 1742-52.
- Dorn, L.D., Biro, F.M. (2011). Puberty and its measurement: a decade in review. *Journal of Research on Adolescence*, 21, 180-195.
- Dumontheil, I., Apperly, I. A., & Blakemore, S. J. (2010). Online usage of theory of mind continues to develop in late adolescence. *Developmental Science*, 13(2), 331-338.
- Dwyer, K.M., Fredstrom, B.K., Rubin, K.H., Booth-LaForce, C., Rose-Krasnor, L., Burgess, K.B. (2010). Attachment, social information processing, and friendship quality of early adolescent girls and boys. *Journal of Social and Personal Relationships*, 27(1), 91-116.

E

- Eaton, D.K., Kann, L., Kinchen, S., Shanklin, S., Flint, K.H., Hawkins, J., Harris, W.A., Lowry, R., McManus, T., Chyen, D., Whittle, L., Lim, C., Wechsler, H., Centers for Disease Control and Prevention (2012). Youth risk behavior surveillance: United States, 2011. *MMWR Surveill Summ*, 61, 1-162.
- Enter, D., Spinhoven, P., & Roelofs, K. (2014). Alleviating social avoidance: effects of single dose testosterone administration on approach-avoidance action. *Hormones & Behavior*, 65(4), 351-354.
- Ernst, M., Nelson, E.E., Jazbec, S., McClure, E.B., Monk, C.S., Leibenluft, E., Pine, D.S. (2005). Amygdala and nucleus accumbens in responses to receipt and omission of gains in adults and adolescents. *NeuroImage*, 25(4), 1279-1291.
- Ernst, M., Pine, D.S., Hardin, M. (2006). Triadic model of the neurobiology of motivated behavior in adolescence. *Psychological Medicine*, 36, 299-312.

F

- Fareri, D.S., Niznikiewicz, M.A., Lee, V.K., Delgado, M.R. (2012). Social network modulation of reward-related signals. *Journal of Neuroscience*, 32(26), 9045-9052.
- Farrer, C., & Frith, C. D. (2002). Experiencing oneself vs another person as being the cause of an action: The neural correlates of the experience of agency. *NeuroImage*, 15(3), 596-603.
- Fehr, E., Camerer, C.F. (2007). Social neuroeconomics: the neural circuitry of social preferences. *Trends in Cognitive Sciences*, 11(10), 419-27.
- Figner, B., Mackinlay, R.J., Wilkening, F., Weber, E.U. (2009). Affective and deliberative processes in risky choice: age differences in risk taking in the Columbia card task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 35, 709-730.
- Flagan, T., Beer, J.S. (2013). Three ways in which midline regions contribute to self-evaluation. *Frontiers in Human Neuroscience*, 7, 450.
- Forbes, E. E., Ryan, N. D., Phillips, M. L., Manuck, S. B., Worthman, C. M., Moyles, D. L., & Dahl, R. E. (2010). Healthy adolescents' neural response to reward: associations with puberty, positive affect, and depressive symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry*, 49(2), 162-172 e161-165.
- Frith, C.D., Frith, U. (2012). Mechanisms of social cognition. *Annual Review of Psychology*, 63, 287-313.

G

- Galvan, A. (2010). Adolescent development of the reward system. *Frontiers in Human Neuroscience*, 4, 1-9.
- Galvan, A., Hare, T., Voss, H., Glover, G., Casey, B.J. (2007). Risk taking and the adolescent brain: who is at risk? *Developmental Science*, 10, F8 -F14.
- Galvan, A., Hare, T.A., Parra, C.E., Penn, J., Voss, H., Glover, G., Casey, B.J. (2006). Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk taking behavior in adolescents. *Journal of Neuroscience*, 26, 6885-6892.
- Galvan, A., & McGlennen, K. M. (2013). Enhanced striatal sensitivity to aversive reinforcement in adolescents versus adults. *Journal of Cognitive Neuroscience*, 25(2), 284-296.
- Galvan, A., Van Leijenhorst, L., McGlennen, K.M. (2012). Considerations for imaging the adolescent brain. *Developmental Cognitive Neuroscience*, 2(3), 293-302.
- Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: an experimental study. *Developmental Psychology*, 41(4), 625-635.

- Geier, C.F., Terwilliger, R., Teslovich, T., Velanova, K., Luna, B. (2010). Immaturities in reward processing and its influence on inhibitory control in adolescence. *Cerebral Cortex*, 20(7), 1613-1629.
- Goddings, A.L., Burnett Heyes, S., Bird, G., Viner, R.M., Blakemore, S.J. (2012). The relationship between puberty and social emotion processing. *Developmental Science*, 15(6), 801-811.
- Goddings, A. L., Mills, K. L., Clasen, L. S., Giedd, J. N., Viner, R. M., & Blakemore, S. J. (2014). The influence of puberty on subcortical brain development. *NeuroImage*, 88, 242-251.
- Goetz, S. M. M., Tang, L. F., Thomason, M. E., Diamond, M. P., Hariri, A. R., & Carre, J. M. (2014). Testosterone Rapidly Increases Neural Reactivity to Threat in Healthy Men: A Novel Two-Step Pharmacological Challenge Paradigm. *Biological Psychiatry*, 76(4), 324-331.
- Güroğlu, B., Haselager, G.J., van Lieshout, C.F., Takashima, A., Rijpkema, M., Fernandez, G. (2008). Why are friends special? Implementing a social interaction simulation task to probe the neural correlates of friendship. *NeuroImage*, 39(2), 903-910.

H

- Haber, S.N., Knutson, B. (2010). The reward circuit: linking primate anatomy and human imaging. *Neuropsychopharmacology*, 35(1), 4-26.
- Hartup, W.W., Stevens, N. (1997). Friendships and adaptation in the life course. *Psychological Bulletin*, 121(3), 355.
- Hawk, S. T., Keijsers, L., Branje, S. J. T., Van der Graaff, J., de Wied, M., & Meeus, W. (2013). Examining the Interpersonal Reactivity Index (IRI) Among Early and Late Adolescents and Their Mothers. *Journal of Personality Assessment*, 95(1), 96-106.
- Hermans, E.J., Bos, P.A., Ossewaarde, L., Ramsey, N.F., Fernandez, G., van Honk, J. (2010). Effects of exogenous testosterone on the ventral striatal BOLD response during reward anticipation in healthy women. *NeuroImage*, 52, 277-283.
- Herting, M. M., Gautam, P., Spielberg, J. M., Kan, E., Dahl, R. E., & Sowell, E. R. (2014). The Role of Testosterone and Estradiol in Brain Volume Changes Across Adolescence: A Longitudinal Structural MRI Study. *Human Brain Mapping*, 35(11), 5633-5645.
- Hutchison, R. M., & Morton, J. B. (2015). Tracking the Brain's Functional Coupling Dynamics over Development. *Journal of Neuroscience*, 35(17), 6849-6859.

I

- Izuma, K., Saito, D.N., Sadato, N. (2008). Processing of social and monetary rewards in the human striatum. *Neuron*, 58(2), 284-94.

K

- Khairullah, A., Klein, L.C., Ingle, S.M., May, M.T., Whetzel, C.A., Susman, E.J., Paus, T. (2014). Testosterone trajectories and reference ranges in a large longitudinal sample of male adolescents. *PloS One*, 9, e108838.
- Koolschijn, P. C., Schel, M. A., de Rooij, M., Rombouts, S. A., & Crone, E. A. (2011). A three-year longitudinal functional magnetic resonance imaging study of performance monitoring and test-retest reliability from childhood to early adulthood. *Journal of Neuroscience*, 31(11), 4204-4212.
- Knutson, B., Fong, G.W., Adams, C.M., Varner, J.L., Hommer, D. (2001). Dissociation of reward anticipation and outcome with event-related fMRI. *Neuroreport*, 12(17), 3683-7.

L

- Lee, V.E. (2000). Using hierarchical linear modeling to study social contexts: the case of school effects. *Educational Psychology*, 35, 125-141.
- Lejuez, C.W., Read, J.P., Kahler, C.W., Richards, J.B., Ramsey, S.E., Stuart, G.L., Strong, D.R., Brown, R.A. (2002). Evaluation of a behavioral measure of risk taking: the balloon analogue risk task (BART). *Journal of Experimental Psychology: Applied*, 8, 75-84.
- Lejuez, C.W., Aklin, W.M., Zvolensky, M.J., Pedulla, C.M. (2003). Evaluation of the balloon analogue risk task (BART) as a predictor of adolescent real-world risk taking behaviours. *Journal of Adolescence*, 26, 475-479.
- Lejuez, C.W., Aklin, W., Daughters, S., Zvolensky, M., Kahler, C., Gwadz, M. (2007). Reliability and validity of the youth version of the balloon analogue risk task (BART-Y) in the assessment of risk taking behavior among inner-city adolescents. *Journal of Clinical Child & Adolescent Psychology*, 36, 106-111.
- Lieberman, M.D., Cunningham, W.A. (2009). Type I and Type II error concerns in fMRI research: re-balancing the scale. *Social Cognitive and Affective Neuroscience*, 4(4), 423-428.

M

- Mars, R. B., Sallet, J., Schuffelgen, U., Jbabdi, S., Toni, I., & Rushworth, M. F. S. (2012). Connectivity-Based Subdivisions of the Human Right "Temporoparietal Junction Area": Evidence for Different Areas Participating in Different Cortical Networks. *Cerebral Cortex*, 22(8), 1894-1903.
- Mihm, M., Gangooly, S., Muttukrishna, S. (2011). The normal menstrual cycle in women. *Animal Reproduction Science*, 124, 229 -236.
- Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Reviews Neuroscience*, 24, 167-202.
- Mills, K.L., Goddings, A.L., Clasen, L.S., Giedd, J.N., Blakemore, S.J. (2014). The developmental mismatch in structural brain maturation during adolescence. *Developmental Neuroscience*, 36,147-160.
- Mills, K. L., Lalonde, F., Clasen, L. S., Giedd, J. N., & Blakemore, S. J. (2014). Developmental changes in the structure of the social brain in late childhood and adolescence. *Social Cognitive and Affective Neuroscience*, 9(1), 123-131.
- Mitchell, J.P., Banaji, M.R., Macrae, C.N. (2005). The link between social cognition and self-referential thought in the medial prefrontal cortex. *Journal of Cognitive Neuroscience*, 17(8), 1306-1315.
- Mobbs, D., Yu, R., Meyer, M., Passamonti, L., Seymour, B., Calder, A.J., Dalgleish, T. (2009). A key role for similarity in vicarious reward. *Science*, 324(5929), 900.
- Murray, R.J., Schaer, M., Debbane, M. (2012). Degrees of separation: a quantitative neuro-imaging meta-analysis investigating self-specificity and shared neural activation between self-and other-reflection. *Neuroscience & Biobehavioral Reviews*, 36(3), 1043-1059.

N

- Nelson, E.E., Leibenluft, E., McClure, E.B., Pine, D.S. (2005). The social re-orientation of adolescence: a neuroscience perspective on the process and its relation to psychopathology. *Psychological Medicine*, 35, 163-174.
- Nicoll, A., Klein-Flugge, M.C., Hunt, L.T., Vlaev, I., Dolan, R.J., Behrens, T.E. (2012). An agent independent axis for executed and modeled choice in medial prefrontal cortex. *Neuron*, 75(6), 1114-21.

O

- O'Brien, L., Albert, D., Chein, J., & Steinberg, L. (2011). Adolescents Prefer More Immediate Rewards When in the Presence of their Peers. *Journal of Research on Adolescence*, 21(4), 747-753.
- Op de Macks, Z.A., Gunther Moor, B., Overgaauw, S., Güroğlu, B., Dahl, R.E., Crone, E.A. (2011). Testosterone levels correspond with increased ventral striatum activation in response to monetary rewards in adolescents. *Developmental Cognitive Neuroscience*, 1, 506 -516.
- Ordaz, S.J., Foran, W., Velanova, K., Luna, B. (2013). Longitudinal growth curves of brain function underlying inhibitory control through adolescence. *Journal of Neuroscience*, 33, 18109 -18124.

P

- Padmanabhan, A., Geier, C. F., Ordaz, S. J., Teslovich, T., & Luna, B. (2011). Developmental changes in brain function underlying the influence of reward processing on inhibitory control. *Developmental Cognitive Neuroscience*, 1(4), 517-529.
- Peper, J.S., Dahl, R.E. (2013). The teenage brain: surging hormones: brain-behavior interactions during puberty. *Current Directions in Psychological Science*, 22, 134 -139.
- Peper, J.S., Mandl, R.C., Braams, B.R., de Water, E., Heijboer, A.C., Koolschijn, P.C., Crone, E.A. (2013). Delay discounting and frontostriatal fiber tracts: a combined DTI and MTR study on impulsive choices in healthy young adults. *Cerebral Cortex*, 23, 1695-1702.
- Peper, J.S., Koolschijn, P.C., Crone, E.A. (2013). Development of risk taking: contributions from adolescent testosterone and the orbito-frontal cortex. *Journal of Cognitive Neuroscience*, 25, 2141-2150.
- Peters, S., Braams, B.R., Raijmakers, M.E., Koolschijn, P.C., Crone, E.A. (2014). The neural coding of feedback learning across child and adolescent development. *Journal of Cognitive Neuroscience*, 26, 1705-1720.
- Peters, S., Jolles, D. J., Van Duijvenvoorde, A. C., Crone, E. A., & Peper, J. S. (2015). The link between testosterone and amygdala-orbitofrontal cortex connectivity in adolescent alcohol use. *Psychoneuroendocrinology*, 53, 117-126.
- Petersen, A.C., Crockett, L., Richards, M., Boxer, A. (1988). A self-report measure of pubertal status: reliability, validity, and initial norms. *Journal of Youth and Adolescence*, 17, 117-133.
- Petrini, K., Piwek, L., Crabbe, F., Pollick, F. E., & Garrod, S. (2014). Look at Those Two!: The Precuneus Role in Unattended Third-Person Perspective of Social Interactions. *Human Brain Mapping*, 35(10), 5190-5203.
- Pfeifer, J. H., & Blakemore, S. J. (2012). Adolescent social cognitive and affective neuroscience: past, present, and future. *Social Cognitive and Affective Neuroscience*, 7(1), 1-10.
- Pfeifer, J. H., Kahn, L. E., Merchant, J. S., Peake, S. J., Veroude, K., Masten, C. L., . . . Dapretto, M. (2013). Longitudinal Change in the Neural Bases of Adolescent Social Self-Evaluations: Effects of Age and Pubertal Development. *Journal of Neuroscience*, 33(17), 7415-7419.
- Pfeifer, J.H., Lieberman, M.D., Dapretto, M. (2007). "I know you are but what am I?": neural bases of self- and social knowledge retrieval in children and adults. *Journal of Cognitive Neuroscience*, 19(8), 1323-37.
- Pfeifer, J. H., Masten, C. L., Borofsky, L. A., Dapretto, M., Fuligni, A. J., & Lieberman, M. D. (2009). Neural correlates of direct and reflected self-appraisals in adolescents and adults: when social perspective-taking informs self-perception. *Child Development*, 80(4), 1016-1038.
- Pfeifer, J. H., & Peake, S. J. (2012). Self-development: Integrating cognitive, socioemotional, and neuroimaging perspectives. *Developmental Cognitive Neuroscience*, 2(1), 55-69.

- Pillutla, M.M., Murnighan, J.K. (1996). Unfairness, anger, and spite: Emotional rejections of ultimatum offers. *Organizational Behavior and Human Decision Processes*, 68(3), 208-24.
- Pinheiro, J., Bates, D., DebRoy, S., Sarkar, D., R Development Core Team (2013). Nlme: linear and nonlinear mixed effects models. R package version 3.1-104.
- Poldrack, R.A., Pare-Blagoev, E.J., Grant, P.E. (2002). Pediatric functional magnetic resonance imaging: progress and challenges. *Topics in Magnetic Resonance Imaging*, 13(1), 61-70.

R

- R Core Team (2014). R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing.
- Rao, H., Korkcykowski, M., Pluta, J., Hoang, A., Detre, J.A. (2008). Neural correlates of voluntary and involuntary risk taking in the human brain: an fMRI Study of the Balloon Analog Risk Task (BART). *NeuroImage*, 42(2), 902-10.
- Richards, J.M., Plate, R.C., Ernst, M. (2013). A systematic review of fMRI reward paradigms used in studies of adolescents vs. adults: the impact of task design and implications for understanding neurodevelopment. *Neuroscience & Biobehavioral Reviews*, 37(5), 976-991.
- Rilling, J., Gutman, D., Zeh, T., Pagnoni, G., Berns, G., Kilts, C. (2002). A neural basis for social cooperation. *Neuron*, 35(2), 395-405.
- Robbins, T. W., Gillan, C. M., Smith, D. G., de Wit, S., & Ersche, K. D. (2012). Neurocognitive endophenotypes of impulsivity and compulsivity: towards dimensional psychiatry. *Trends in Cognitive Science*, 16(1), 81-91.
- Ruby, P., & Decety, J. (2004). How would you feel versus how do you think she would feel? A neuroimaging study of perspective-taking with social emotions. *Journal of Cognitive Neuroscience*, 16(6), 988-999.
- Rubin, K., Fredstrom, B., Bowker, J. (2008). Future directions in friendship in childhood and early adolescence. *Social Development*, 17(4), 1085-1096.

S

- Saxbe, D., Del Piero, L., Immordino-Yang, M. H., Kaplan, J., & Margolin, G. (2015). Neural correlates of adolescents' viewing of parents' and peers' emotions: Associations with risk taking behavior and risky peer affiliations. *Social Neuroscience*, 1-13.
- Sanfey, A.G., Rilling, J.K., Aronson, J.A., Nystrom, L.E., Cohen, J.D. (2003). The neural basis of economic decision-making in the Ultimatum Game. *Science*, 300(5626), 1755-1758.
- Scherf, K. S., Berman, M., & Dahl, R. E. (2012). Facing changes and changing faces in adolescence: A new model for investigating adolescent-specific interactions between pubertal, brain, and behavioral development. *Developmental Cognitive Neuroscience*, 2(2), 199-219.
- Schurz, M., Aichhorn, M., Martin, A., & Perner, J. (2013). Common brain areas engaged in false belief reasoning and visual perspective taking: a meta-analysis of functional brain imaging studies. *Frontiers in Human Neuroscience*, 7.
- Schwarz, G. (1978). Estimating dimension of a model. *Annals of Statistics*, 6, 461-464.
- Sebastian, C.L., Tan, G.C., Roiser, J.P., Viding, E., Dumontheil, I., Blakemore, S.J. (2011). Developmental influences on the neural bases of responses to social rejection: implications of social neuroscience for education. *NeuroImage*, 57(3), 686-694.
- Sescousse, G., Caldu, X., Segura, B., Dreher, J.C. (2013). Processing of primary and secondary rewards: a quantitative meta-analysis and review of human functional neuroimaging studies. *Neuroscience & Biobehavioral Reviews*.

- Shirtcliff, E.A., Dahl, R.E., Pollak, S.D. (2009). Pubertal development: correspondence between hormonal and physical development. *Child Development*, 80, 327-337.
- Shulman, E.P., Harden, K.P., Chein, J.M., Steinberg, L. (2015). Sex differences in the developmental trajectories of impulse control and sensation-seeking from early adolescence to early adulthood. *Journal of Youth & Adolescence*, 44, 1-17.
- Singer, T., Seymour, B., O'Doherty, J.P., Stephan, K.E., Dolan, R.J., Frith, C.D. (2006). Empathic neural responses are modulated by the perceived fairness of others. *Nature*, 439(7075), 466-469.
- Sisk, C.L., Foster, D.L. (2004). The neural basis of puberty and adolescence. *Nature Neuroscience*, 7, 1040-1047.
- Smith, A. B., Halari, R., Giampetro, V., Brammer, M., & Rubia, K. (2011). Developmental effects of reward on sustained attention networks. *NeuroImage*, 56(3), 1693-1704.
- Somerville, L.H., Jones, R.M., Casey, B.J. (2010). A time of change: behavioral and neural correlates of adolescent sensitivity to appetitive and aversive environmental cues. *Brain & Cognition*, 72(1), 124-133.
- Somerville, L.H., Jones, R.M., Ruberry, E.J., Dyke, J.P., Glover, G., Casey, B.J. (2013). The medial prefrontal cortex and the emergence of self-conscious emotion in adolescence. *Psychological Science*, 24(8), 1554-1562.
- Spear, L.P. (2013). The teenage brain: adolescents and alcohol. *Current Directions in Psychological Science*, 22, 152-157.
- Spielberg, J.M., Olino, T.M., Forbes, E.E., Dahl, R.E. (2014). Exciting fear in adolescence: does pubertal development alter threat processing? *Developmental Cognitive Neuroscience*, 8, 86-95.
- Steinberg, L. (2004). Risk taking in adolescence: what changes, and why? *Annals of the New York Academy of Sciences*, 1021, 51-58.
- Steinberg, L. (2008). A social neuroscience perspective on adolescent risk taking. *Developmental Review*, 28 (1), 78-106.
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: evidence for a dual systems model. *Developmental Psychology*, 44, 1764-1778.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review Psychology*, 52, 83-110.
- Sumter, S. R., Bokhorst, C. L., Steinberg, L., & Westenberg, P. M. (2009). The developmental pattern of resistance to peer influence in adolescence: Will the teenager ever be able to resist? *Journal of Adolescence*, 32(4), 1009-1021.
- Susman, E. J., & Rogol, A. (2004). Puberty and psychological development. *Handbook of adolescent psychology*, 2, 15-44.

T

- Takahashi, Y., Yamagata, S., Kijima, N., Shigemasa, K., Ono, Y., Ando, J. (2007). Continuity and change in behavioral inhibition and activation systems: a longitudinal behavioral genetic study. *Journal of Personality & Individual Differences*, 43, 1616-1625.
- Tan, P. Z., Lee, K. H., Dahl, R. E., Nelson, E. E., Stroud, L. J., Siegle, G. J., . . . Silk, J. S. (2014). Associations between maternal negative affect and adolescent's neural response to peer evaluation. *Developmental Cognitive Neuroscience*, 8, 28-39.
- Tanner, J. M., & Whitehouse, R. H. (1976). Clinical Longitudinal Standards for Height, Weight, Height Velocity, Weight Velocity, and Stages of Puberty. *Archives of Disease in Childhood*, 51(3), 170-179.
- Team, R. C. (2014). R: A language and environment for statistical computing.

- Telzer, E.H., Fuligni, A.J., Lieberman, M.D., Galvan, A. (2013). Ventral striatum activation to prosocial rewards predicts longitudinal declines in adolescent risk taking. *Developmental Cognitive Neuroscience*, 3, 45-52.
- Telzer, E.H., Masten, C.L., Berkman, E.T., Lieberman, M.D., Fuligni, A.J. (2010). Gaining while giving: an fMRI study of the rewards of family assistance among white and Latino youth. *Social Neuroscience*, 5(5-6), 508-518.
- Tymula, A., Rosenberg Belmaker, L. A., Roy, A. K., Ruderman, L., Manson, K., Glimcher, P. W., & Levy, I. (2012). Adolescents' risk taking behavior is driven by tolerance to ambiguity. *Proceedings of the National Academy of Sciences U S A*, 109(42), 17135-17140.

U

- Urošević, S., Collins, P., Muetzel, R., Lim, K., Luciana, M. (2012). Longitudinal changes in behavioral approach system sensitivity and brain structures involved in reward processing during adolescence. *Developmental Psychology*, 48, 1488 -1500.

V

- Valkenberg, H., Van Leeuwen, L., Klein Wolt, K., & Goossens, F. (2012). Alcohol en jongeren: een vervolgonderzoek onder spoedeisende hulpbezoekers. VeiligheidNL en Trimbos-instituut.
- Van den Bos, W., van Dijk, E., Westenberg, M., Rombouts, S.A., Crone, E.A. (2009). What motivates repayment? Neural correlates of reciprocity in the Trust Game. *Social Cognitive and Affective Neuroscience*, 4(3), 294-304.
- Van Duijvenvoorde, A.C., Op de Macks, Z.A., Overgaauw, S., Gunther Moor, B., Dahl, R.E., Crone, E.A. (2014). A cross-sectional and longitudinal analysis of reward-related brain activation: effects of age, pubertal stage, and reward sensitivity. *Brain & Cognition*, 89, 3-14.
- Van Duijvenvoorde, A.C., Huizenga, H.M., Somerville, L.H., Delgado, M.R., Powers, A., Weeda, W.D., Casey, B.J., Weber, E.U., Figner, B. (2015). Neural correlates of expected risks and returns in risky choice across development. *Journal of Neuroscience*, 35, 1549 -1560.
- van Honk, J., Schutter, D. J., Hermans, E. J., Putman, P., Tuiten, A., & Koppeschaar, H. (2004). Testosterone shifts the balance between sensitivity for punishment and reward in healthy young women. *Psychoneuroendocrinology*, 29(7), 937-943.
- Van Hoorn, J., Van Dijk, E., Meuwese, R., Rieffe, C., & Crone, E. A. (2014). Peer Influence on Prosocial Behavior in Adolescence. *Journal of Research on Adolescence*.
- Van Leijenhorst, L., Gunther Moor, B., Op de Macks, Z.A., Rombouts, S.A., Westenberg, P.M., Crone, E.A. (2010a). Adolescent risky decision-making: neurocognitive development of reward and control regions. *NeuroImage*, 51(1), 345-355.
- Van Leijenhorst, L., Westenberg, P. M., & Crone, E. A. (2008). A developmental study of risky decisions on the cake gambling task: age and gender analyses of probability estimation and reward evaluation. *Developmental Neuropsychology*, 33(2), 179-196.
- Van Leijenhorst, L., Zanolie, K., Van Meel, C.S., Westenberg, P.M., Rombouts, S.A., Crone, E. A., (2010b). What motivates the adolescent? Brain regions mediating reward sensitivity across adolescence. *Cerebral Cortex*, 20(1), 61-69.
- Van Overwalle, F. (2009). Social cognition and the brain: a meta-analysis. *Human Brain Mapping*, 30(3), 829-858.
- Varnum, M.E., Shi, Z., Chen, A., Qiu, J., Han, S. (2014). When “Your” reward is the same as “My” reward: Self-construal priming shifts neural responses to own vs. friends’ rewards. *NeuroImage*, 87, 164-169.

W

Wechsler, D. (1997). Wechsler adult intelligence scale — third edition. Administration and scoring manual. The Psychological Corporation, San Antonio.

Weigard, A., Chein, J., Albert, D., Smith, A., & Steinberg, L. (2014). Effects of anonymous peer observation on adolescents' preference for immediate rewards. *Developmental Science*, 17(1), 71-78.

Will, G. J., van Lier, P. A., Crone, E. A., & Guroglu, B. (2015). Chronic Childhood Peer Rejection is Associated with Heightened Neural Responses to Social Exclusion During Adolescence. *Journal of Abnormal Child Psychology*.

Williams, K. D. (2007). Ostracism. *Annual Review of Psychology*, 58, 425-452.

Y

Young, L., Dodell-Feder, D., Saxe, R. (2010). What gets the attention of the temporo-parietal junction? An fMRI investigation of attention and theory of mind. *Neuropsychologia*, 48(9), 2658-2664.

