

‘I need to eat today, not in September’: a simple model of intertemporal decisions under a desperation threshold

Benoit de Courson

2024-04-23

I Introduction

Time discounting - the devaluation of future consequences - shows a clear gradient with economic resources (Reimers et al. 2009; Green et al. 1996; Haushofer and Fehr 2014). Concretely, low-income individuals are often observed to refuse high return investment opportunities and to accept loans with prohibitive interest rates (Banerjee and Duflo 2007). In a recent review (Haushofer and Salicath 2023), higher time discounting actually appeared as the only well established causal effect of poverty on decision making. This effect is of interest to several disciplines, including economics (Lawrance 1991), sociology (Duvoux 2023) and psychology (Haushofer and Fehr 2014). It has important implications: it has been proposed (i) as the cause of the ‘behavioural constellation of poverty’, the ensemble of behavioral specificities across domains that are commonly found among individuals in situations of poverty (Pepper and Nettle 2017), (ii) as a possible reason why people tend to be stuck in poverty (Haushofer and Fehr 2014), and (iii) as a reason for the higher prevalence of crime - a behaviour that often brings short-term benefits and potential long-term legal troubles - among deprived populations (Pepper and Nettle 2017; Brezina, Tekin, and Topalli 2008).

Yet, in stark contrast with the mostly settled empirical case, it remains highly debated why individuals do so. Theoretical work in this question can be traced back to Fisher (1930), who claimed that “Poverty [...] increases the want for immediate income even more than it increases the want for future income. [...] This influence of poverty is partly rational, because of the importance, by supplying present needs, of keeping up the continuity of life and thus maintaining the ability to cope with the future; and partly irrational, because the pressure of present needs blinds a person to the needs of the future” (p. 72).

Since, several bodies of literature have proposed theoretical explanations for this social gradient. We can first divide these explanations in two classes, insisting respectively on the “rational” and “irrational” aspects.

I.1 Time discounting as an irrational decision

A first body of literature sees impulsive decision making as an irrational decision, induced in situations of poverty by a degraded decision making. Several mechanisms have been proposed for this: poverty could lead to a lower cognitive capacity due to stress (Haushofer and Fehr 2014; Mani et al. 2013), or lead to an ego-depletion phenomenon (Spears 2011) – but since, both mechanisms have shown replication issues (González-Arango et al. 2022; Hagger et al. 2016; Haushofer and Salicath 2023). Recently, Laajaj (2017) proposed that not thinking about the future could be, as Banerjee and Duflo (2007) (p. 165) put it, “emotionally wise” in situations of poverty, “to reduce the distress generated by the anticipation of future hardship” (p. 187).

These arguments make a strong assumption: that high time discounting is dysfunctional. However, even if focusing on the present is associated with worse outcomes in life, it does not imply that it is always detrimental (Daly and Wilson 2005; Frankenhuis and Nettle 2020). This might in particular be false in situations of poverty: as Frankenhuis and Nettle (2020) put it, “some people obviously need to use their resources immediately to meet basic needs (e.g., food, shelter) or live in conditions in which future rewards are unlikely to materialize.” (p. 17).

I.2 Time discounting as a rational response to a state of poverty

Therefore, a second body of literature has proposed reasons why focusing on the short-term could be at least “partly rational” response to poverty - or, equivalently, an evolutionary adaptation to resource scarcity through phenotypic plasticity (Pepper

and Nettle 2017; Mell, Baumard, and André 2019; Boon-Falleur, Baumard, and André 2024). Here, this is the view we focus on. As Frankenhuys and Nettle (2020) quote implies, such explanations can be divided in two classes, namely “collection risks” and “opportunity costs” (David W. Stephens 2002; Fawcett, McNamara, and Houston 2012). We also focus on poverty as a “state”, rather than a “harshness”, i.e. an environment-level stable parameter. For this reason, we do not mention most of the models reviewed in Fenneman, Frankenhuys, and Todd (2022), as they study what environmental conditions favor impulsivity, instead of state.

1.2.1 Collection risks

The first class of explanations focuses on “collection risks”, the probability that the future reward will not be cashed in. The most natural example of a collection risk is mortality: if one is unlikely to be alive tomorrow, it makes little sense to wait for a larger reward. Empirically, low-SES individuals experience higher mortality risks throughout their lifespan, which should lead them to discount the future more steeply. This rationale has been widely used to explain the social gradient in time preference, in particular in evolutionary psychology (Griskevicius, Tybur, et al. 2011; Griskevicius, Delton, et al. 2011; Pepper and Nettle 2017; Baumard 2019).

Recently, it has however been argued that mortality risks are too small by order of magnitudes to account for the amount of time discounting (Riis-Vestergaard and Haushofer 2017; Mell, Baumard, and André 2017). In Riis-Vestergaard and Haushofer (2017), the authors conclude that only 0.13% of the observed discounting can be attributed to mortality. Therefore, it is hard to see how the social gradient in mortality could account for the large social gradient in time discounting. It remains possible that poverty increases collection risks unrelated to mortality: poverty could create a higher probability that something happens to the reward before it can be cashed in (Riis-Vestergaard and Haushofer 2017). This brings an empirical question that remains open: to what extent do collection risks differ between SES? Furthermore, collection risk is not a ‘state’ variable, but rather an environment parameter, plausibly statistically related to poverty, but quite stable on short term scales. It can therefore not explain the fact that a state like hunger increases time discounting in humans (Wang and Dvorak 2010; Allen and Nettle 2021; Kirk and Logue 1997) + HEROIN GIORDANO.

1.2.2 Waiting costs and basic needs

In any case, collection risks are only one side of the problem. When deciding whether to wait for a larger reward, one should not only consider the probability that the future reward is obtained, but also what the individual would do with the resources in the meantime. This brings a second question: can poverty increase the “opportunity costs” of resources? Along with the title quote, several verbal arguments claim that it is the case: Frankenhuys and Nettle (2020) argue that “some people obviously need to use their resources immediately to meet basic needs (e.g., food, shelter)” (p. 17), while Haushofer, Schunk, and Fehr (2013) propose that “people may simply have to put food on the table today, and therefore appear impatient” (p. 2).

It is indeed obvious that situations of poverty increase the utility of consuming resources now: this follows from the widely accepted assumption of diminishing marginal utility. However, this does not suffice to obtain a social gradient: the optimal level of time discounting depends not only on the value of present consumption, but also on the (expected) value of future consumption, which should also increase in situations of poverty. If she expects to need the resources even more badly tomorrow, she should actually save them. The reasoning is only valid if the resources matter for survival, for instance if the individual has a chance to die by starvation otherwise. This situation, where insufficient consumption increases mortality, has for instance been formalised by Chavas (2013) - who interestingly, calls this result a mere “conjecture”, since it follows so directly from the assumptions.

If survival is not at stake, though, the reasoning does not stand. Yet, even if survival is guaranteed, there are still “needs” that one could consider as “basic”, in the sense that it is particularly painful not to meet them. There, verbal theories still predict that not being able to meet them should produce impulsivity (Haushofer, Schunk, and Fehr 2013; Frankenhuys and Nettle 2020). There have been, to our knowledge, two attempts to formalise this argument:

- In economics, T. Epper (2015) proposed that “liquidity constraints” could produce impulsive decisions. The reasoning is the following. If consumption has diminishing marginal utility, one should smooth his consumption over time, and ideally consume the exact same amount at every time period of his life. This is called the ‘permanent income hypothesis’, a classical idea in economics (Friedman 1957). Now, if she is poorer at some moments of her life, and if there exists a frictionless financial market, she should borrow at those moments to maintain a stable ‘consumption path’. In reality, though, it can be hard to borrow, in particular for individuals with low or unpredictable incomes. Then, an individual who has unusually little resources on this time period would like to consume more, but can not:

he is “liquidity constrained”. In this situation, he would clearly prefer $r\text{€}$ now to $r\text{€}$ later. In Haushofer, Schunk, and Fehr (2013), this model is interpreted in terms of basic needs: “people may simply have to put food on the table today, and therefore appear impatient” (p. 2).

- Mell, Baumard, and André (2021) proposed that poverty was analogous to being a young, growing startup company. Resources are not only useful for consumption, but also for investing in his human capital, and generate more resources thereafter. Like a startup, an individual with little capital has a larger potential to increase his productivity - assuming that capital has diminishing returns on productivity. Therefore, such an individual should prefer a small and sooner reward because he could, in the meantime, use it to grow faster. In contrast, a richer individual has a smaller scope for improving his productivity, and should therefore be more indifferent.

Both models make an important assumption: they posit that those individuals “expect their income to rise in a not so distant future” (T. Epper 2015, 1). Otherwise, their prediction reverse: “If a(n) (relatively poor) agent expects her income to decline substantially in the not so distant future [...], predicted discount rates will lie below the agent’s pure rate of time preference” (T. Epper 2015, 19). In Mell, Baumard, and André (2019), the model is introduced by the same citation from the TV show *Atlanta* that we used in the title (“poor people don’t have time for investments, because poor people are too busy trying not to be poor! I need to eat today, not in September...”). Though, one also needs to eat tomorrow, and the model only yields the desired prediction if it assumes that once they have eaten today, they will instead have to meet a less crucial need tomorrow, like accommodation. [Daniel asked me to reanalyse the model to make sure my assessment was correct. I had a chat with Jean-Baptiste, and it is clear that if productivity is not rising over time, time preference is only determined by extrinsic mortality. If mortality is independent from poverty, then it should have no effect, and if it is, then it is a “collection risks” argument]

Thus, the two models implicitly assume that situations of poverty are temporary, and that things have good chances to improve. Therefore, it is hard to see how they apply to the “truly disadvantaged” (Wilson 2012) who, on the contrary, tend to (i) have little chance to exit poverty (Banerjee and Duflo 2012) and (ii) to be very pessimistic about their future (Brezina, Tekin, and Topalli 2008). In an ethnography of Saint Louis offenders who combined financial “desperation” (p. 20) with a “present orientation” (p.1), Dickinson, Topalli, and Wright (2024) reported that “offenders view their lives as fatalistic time tracks owing to financial insecurity and unstable futures” (p.1).

We thus consider that the literature lacks a model studying the effect of a “basic needs” assumption on time preferences, in the absence of improvement prospects. In this case, intuition and the empirical record still suggest that individuals discount the future steeply, and the literature lacks an argument to justify it.

1.3 My proposition

We propose to use a “desperation threshold” model to represent this situation. We assume that agents have a critical amount of resources, representing “basic needs”, above which they try to stay at every time period. Concretely, we assume (i) a “utility cliff” - falling below at any point is very unpleasant - and (ii) a “rock bottom” - being below the threshold for a second time does not hurt as bad as the first time [as Daniel elegantly put it, this can be also be phrased as “the first cut is the deepest”]. For instance, not paying rent can be very detrimental to one’s wellbeing, but not paying rent for a second month makes a smaller difference: one risks eviction anyway. Our intuition is that the proximity to the desperation threshold could generate a preference for resources today, which would clearly help to avoid the desperation zone. In contrast, a reward collected in the future could be less useful for two reasons: the individual could (i) have exited the dangerous zone, and not need the resource as badly, and (ii) have stayed below the threshold in between, in which case the “rock bottom” assumption implies that there is little left to save. Then, an individual in situations of poverty could prefer an immediate reward whether he has good or bad prospects: whichever way he moves would make the resource less useful in the future.

We see this model as answering another, inverse, literature gap. There are many “desperation threshold” models in biology, psychology and economics (e.g. Roumasset 1971; D. W. Stephens 1981; Lybbert and Barrett 2007; Barclay, Mishra, and Sparks, n.d.; De Courson and Nettle 2021). Though, they all focus on the consequences of the threshold on risk attitudes, presumably because the result is clear and intuitive. Its effect on time preferences has not yet been studied, possibly because it is less obvious. If the “desperation threshold” exists, though, it might also impact time attitudes, and it is important to understand those consequences even if they are not as straightforward. We only found one model of time preferences (studying mice impulsivity) which includes a threshold (starvation) (Campbell and Persaud 2008). Though, its effect is unclear, and the model does not allow for state-dependence but only for adapting to environment characteristics.

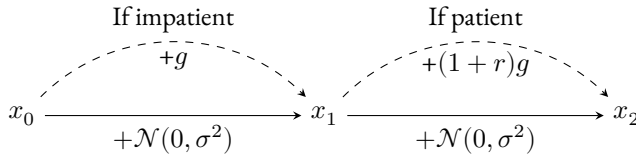
Finally, the proposed model could help to solve another paradox about criminal behaviour. The time discounting literature states that risk and time are intertwined: the future is treated as unpredictable, whereas the present is known (T. F. Epper and Fehr-Duda 2024; Andreoni and Sprenger 2012). Then, risk-averse people should prefer immediate (certain) rewards to future (unpredictable) ones. Conversely, risk tolerant people should be more indifferent. Though, individuals engaging in criminal activity accept the risk of a large future cost (being caught and convicted). Empirically, offenders seem to have both high time discounting and risk tolerance (T. Epper et al. 2022).

1.4 Dynamics

We model an individual who makes an intertemporal decision. Starting from an initial level of resources x_0 , he lives through two time periods (denoted 1 and 2). A normally distributed perturbation (mean 0 and variance σ^2 , representing volatility) is added between x_0 and x_1 , then again between x_1 and x_2 . NB: when solving the model, maybe we could try other distributions, to make it analytically tractable.

At time 0, the agent decides between two options:

- Being 'impatient', and gaining g resources immediately, that is between x_0 and x_1 .
- Being 'patient', and gaining $(1 + r)g$ resources one period later (between x_1 and x_2). r represents the interest rate.



2 Goals of the individual

The individual wants two things: be as rich as possible at the end of the game (maximise x_2) and pay rent at both time period (that is, minimise the probability that $x_1 < 0$ and $x_2 < 0$). One more thing: we assume that not paying rent once hurts a lot ($-\alpha$), not paying it a second time hurts less ($-\beta$, with $0 \leq \beta \leq \alpha$): you might already have been evicted, or anyway you are already in trouble with your landlord. This assumption reflects the idea of a 'rock bottom'. Note that the framework includes the case where there is no rock bottom ($\beta = \alpha$) and the case where it is game over after one rent failure ($\beta = 0$).

The utility function is therefore:

$$U(x_1, x_2) = x_2 - \alpha(x_1 < 0 \cup x_2 < 0) - \beta(x_1 < 0 \cap x_2 < 0)$$

3 Planned analysis

For every value of the parameters, we will compute the interest rate r^* such that the individual is indifferent between patience and impatience, that is, between g resources now and $(1 + r)g$ resources later. In particular, we are interested in :

“{=tex}

- How r^* depends on x_0 , that is, how poverty impacts the willingness to delay the reward.
- To what extent this result depends on the value of β , that is, on whether there is a rock bottom. We expect that a rock bottom exacerbates impatience under extreme poverty.
- How r^* depends on the volatility σ^2 , possibly in interaction with other parameters. In particular, volatility should increase the risk of not paying rent when $x_0 > 0$, but decrease it when $x < 0$ (just as one should gamble below the threshold but not above in our previous models).

Bibliography

Allen, C., and D. Nettle. 2021. “Hunger and Socioeconomic Background Additively Predict Impulsivity in Humans.” *Current Psychology* 40 (5): 2275–89. <https://doi.org/10.1007/s12144-019-0141-7>.

- Andreoni, James, and Charles Sprenger. 2012. "Risk Preferences Are Not Time Preferences." *American Economic Review* 102 (7): 3357–76.
- Banerjee, Abhijit V., and Esther Duflo. 2007. "The Economic Lives of the Poor." *The Journal of Economic Perspectives* 21 (1): 141–68. <https://www.jstor.org/stable/30033705>.
- . 2012. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. Reprint edition. New York: PublicAffairs.
- Barclay, Pat, Sandeep Mishra, and Adam Maxwell Sparks. n.d. "State-Dependent Risk-Taking." *Proceedings of the Royal Society B: Biological Sciences* 285 (1881): 20180180. <https://doi.org/10.1098/rspb.2018.0180>.
- Baumard, Nicolas. 2019. "Psychological Origins of the Industrial Revolution." *Behavioral and Brain Sciences* 42 (January): e189. <https://doi.org/10.1017/S0140525X1800211X>.
- Boon-Falleur, Mélusine, Nicolas Baumard, and Jean-Baptiste André. 2024. "The Effect of Income and Wealth on Behavioral Strategies, Personality Traits, and Preferences." *Perspectives on Psychological Science*, January, 17456916231201512. <https://doi.org/10.1177/17456916231201512>.
- Brezina, Timothy, Erdal Tekin, and Volkan Topalli. 2008. "'Might Not Be a Tomorrow': A Multi-Methods Approach to Anticipated Early Death and Youth Crime." Cambridge, MA. <https://doi.org/10.3386/w14279>.
- Campbell, Thomas G., and Navindra Persaud. 2008. "The Adaptiveness of Self-Control: Simulation of Foraging Mice." *Journal of Comparative Psychology* 122 (4): 368.
- Chavas, Jean-Paul. 2013. "On the Microeconomics of Food and Malnutrition Under Endogenous Discounting." *European Economic Review* 59 (April): 80–96. <https://doi.org/10.1016/j.eurocorev.2013.01.002>.
- Daly, Martin, and Margo Wilson. 2005. "Carpe Diem: Adaptation and Devaluing the Future." *The Quarterly Review of Biology* 80 (1): 55–60.
- De Courson, Benoît, and Daniel Nettle. 2021. "Why Do Inequality and Deprivation Produce High Crime and Low Trust?" *Scientific Reports* 11 (1): 1937. <https://doi.org/10.1038/s41598-020-80897-8>.
- Dickinson, Timothy, Volkan Topalli, and Richard Wright. 2024. *A Sociology of Time and Predatory Offending*.
- Duvoux, Nicolas. 2023. *L'avenir Confisqué: Inégalités de Temps Vécu, Classes Sociales Et Patrimoine*. Paris: PUF.
- Epper, Thomas. 2015. "Income Expectations, Limited Liquidity, and Anomalies in Intertemporal Choice." *University of St. Gallen, School of Economics and Political Science Discussion Paper No 19*.
- Epper, Thomas F., and Helga Fehr-Duda. 2024. "Risk in Time: The Intertwined Nature of Risk Taking and Time Discounting." *Journal of the European Economic Association* 22 (1): 310–54.
- Epper, Thomas, Ernst Fehr, Kristoffer Balle Hvidberg, Claus Thustrup Kreiner, Søren Leth-Petersen, and Gregers Nytoft Rasmussen. 2022. "Preferences Predict Who Commits Crime Among Young Men." *Proceedings of the National Academy of Sciences* 119 (6): e2112645119.
- Fawcett, Tim W., John M. McNamara, and Alasdair I. Houston. 2012. "When Is It Adaptive to Be Patient? A General Framework for Evaluating Delayed Rewards." *Behavioural Processes, Comparative cognition: Function and mechanism in lab and field.*, 89 (2): 128–36. <https://doi.org/10.1016/j.beproc.2011.08.015>.
- Fenneman, Jesse, Willem E. Frankenhuis, and Peter M. Todd. 2022. "In Which Environments Is Impulsive Behavior Adaptive? A Cross-Discipline Review and Integration of Formal Models." *Psychological Bulletin* 148 (7-8): 555.
- Fisher, Irving. 1930. "The Theory of Interest." *New York* 43: 1–19.
- Frankenhuis, Willem E., and Daniel Nettle. 2020. "The Strengths of People in Poverty." *Current Directions in Psychological Science* 29 (1): 16–21. <https://doi.org/10.1177/0963721419881154>.
- Friedman, Milton. 1957. "The Permanent Income Hypothesis." In, 20–37. Princeton University Press.
- González-Arango, Felipe, Javier Corredor, María Angélica López-Ardila, María Camila Contreras-González, Juan Herrera-Santofimio, and Jhonathan Jared González. 2022. "The Duality of Poverty: A Replication of Mani Et Al.(2013) in Colombia." *Theory and Decision*, 1–35.
- Green, Leonard, Joel Myerson, David Lichtman, Suzanne Rosen, and Astrid Fry. 1996. "Temporal Discounting in Choice Between Delayed Rewards: The Role of Age and Income." *Psychology and Aging* 11 (1): 79–84. <https://doi.org/10.1037/0882-7974.11.1.79>.
- Griskevicius, Vladas, Andrew W. Delton, Theresa E. Robertson, and Joshua M. Tybur. 2011. "Environmental Contingency in Life History Strategies: The Influence of Mortality and Socioeconomic Status on Reproductive Timing." *Journal of Personality and Social Psychology* 100 (2): 241.
- Griskevicius, Vladas, Joshua M. Tybur, Andrew W. Delton, and Theresa E. Robertson. 2011. "The Influence of Mortality and Socioeconomic Status on Risk and Delayed Rewards: A Life History Theory Approach." *Journal of Personality and Social Psychology* 100 (6): 1015–26. <https://doi.org/10.1037/a0022403>.
- Hagger, Martin S., Nikos LD Chatzisarantis, Hugo Alberts, Calvin O. Anggono, Cedric Batailler, Angela R. Birt, Ralf Brand,

- Mark J. Brandt, Gene Brewer, and Sabrina Bruyneel. 2016. "A Multilab Preregistered Replication of the Ego-Depletion Effect." *Perspectives on Psychological Science* 11 (4): 546–73.
- Haushofer, Johannes, and Ernst Fehr. 2014. "On the Psychology of Poverty." *Science* 344 (6186): 862–67. <https://doi.org/10.1126/science.1232491>.
- Haushofer, Johannes, and Daniel Salicath. 2023. "The Psychology of Poverty: Where Do We Stand?" <https://doi.org/10.3386/w31977>.
- Haushofer, Johannes, Daniel Schunk, and Ernst Fehr. 2013. "Negative Income Shocks Increase Discount Rates."
- Kirk, J. M., and A. W. Logue. 1997. "Effects of Deprivation Level on Humans' Self-Control for Food Reinforcers." *Appetite* 28 (3): 215–26. <https://doi.org/10.1006/appe.1996.0071>.
- Laajaj, Rachid. 2017. "Endogenous Time Horizon and Behavioral Poverty Trap: Theory and Evidence from Mozambique." *Journal of Development Economics* 127 (July): 187–208. <https://doi.org/10.1016/j.jdeveco.2017.01.006>.
- Lawrance, Emily C. 1991. "Poverty and the Rate of Time Preference: Evidence from Panel Data." *Journal of Political Economy* 99 (1): 54–77.
- Lybbert, Travis J., and Christopher B. Barrett. 2007. "Risk Responses to Dynamic Asset Thresholds." *Review of Agricultural Economics* 29 (3): 412–18. <https://www.jstor.org/stable/4624849>.
- Mani, Anandi, Sendhil Mullainathan, Eldar Shafir, and Jiaying Zhao. 2013. "Poverty Impedes Cognitive Function." *Science* 341 (6149): 976–80. <https://doi.org/10.1126/science.1238041>.
- Mell, Hugo, Nicolas Baumard, and Jean-Baptiste André. 2017. "Both Collection Risk and Waiting Costs Give Rise to the Behavioral Constellation of Deprivation." *Behavioral and Brain Sciences* 40 (November). <https://doi.org/10.1017/S0140525X17001030>.
- . 2019. "Time Is Money. Waiting Costs Explain Why Selection Favors Steeper Time Discounting in Deprived Environments." December. <https://doi.org/10.32942/osf.io/7d56s>.
- . 2021. "Time Is Money. Waiting Costs Explain Why Selection Favors Steeper Time Discounting in Deprived Environments." *Evolution and Human Behavior* 42 (4): 379–87. <https://doi.org/10.1016/j.evolhumbehav.2021.02.003>.
- Pepper, Gillian V., and Daniel Nettle. 2017. "The Behavioural Constellation of Deprivation: Causes and Consequences." *Behavioral and Brain Sciences* 40. <https://doi.org/10.1017/S0140525X1600234X>.
- Reimers, Stian, Elizabeth A. Maylor, Neil Stewart, and Nick Chater. 2009. "Associations Between a One-Shot Delay Discounting Measure and Age, Income, Education and Real-World Impulsive Behavior." *Personality and Individual Differences* 47 (8): 973–78.
- Riis-Vestergaard, Michala Iben, and Johannes Haushofer. 2017. "Stuff Goes Wrong, so Act Now." *Behavioral and Brain Sciences* 40 (January): e340. <https://doi.org/10.1017/S0140525X17001091>.
- Roumasset, James A. 1971. *Risk and Choice of Technique for Peasant Agriculture: Safety First and Rice Production in the Philippines*. Social Systems Research Institute, University of Wisconsin.
- Spears, Dean. 2011. "Economic Decision-Making in Poverty Depletes Behavioral Control." *The BE Journal of Economic Analysis & Policy* 11 (1).
- Stephens, D. W. 1981. "The Logic of Risk-Sensitive Foraging Preferences." *Animal Behaviour* 29 (2): 628–29. [https://doi.org/10.1016/S0003-3472\(81\)80128-5](https://doi.org/10.1016/S0003-3472(81)80128-5).
- Stephens, David W. 2002. "Discrimination, Discounting and Impulsivity: A Role for an Informational Constraint." *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences*, November. <https://doi.org/10.1098/rstb.2002.1062>.
- Wang, X. T., and Robert D. Dvorak. 2010. "Sweet Future: Fluctuating Blood Glucose Levels Affect Future Discounting." *Psychological Science* 21 (2): 183–88. <https://doi.org/10.1177/0956797609358096>.
- Wilson, William Julius. 2012. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. University of Chicago Press.