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Keeping you in sight: the role of focusing effort in commitment to goals

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Abstract

Using a simple consumption-savings model with a $\beta - \delta$ agent, I consider how present-biased individuals remain committed to goals. I find that effort expended to maintain focus on future outcomes, represented as an increase to the δ that applies to the agent's next-period self, offsets the effects of present bias and increases progress toward the agent's goal. My model delivers this result without reference-dependent preferences. The greater the present bias, the more focus is necessary to achieve the same progress. While costless focusing brings perfect commitment, individuals fall short of full goal achievement when focusing is costly.

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"Even as I wander, I'm keeping you in sight. You're a candle in the window on a cold, dark winter's night."

– REO Speedwagon, from "Can't Fight This Feeling"

1 Introduction

From bucket lists to achievements that express deeply-felt values to the imperatives of survival, striving toward the achievement of goals is a defining feature of human existence. An economic literature on the setting of non-binding goals (e.g., Koch & Nafziger 2011, Hsiaw 2013) has emphasized the role that endogenous reference points can play as motivators for present-biased agents.[1] However, three key characteristics of situations involving goals suggest that reference dependence, while sometimes potentially operative, is not the fundamental mechanism at work in goal-motivated behavior.

First, a goal may be exogenous – whereby the question is clearly not one of setting a reference point but rather remaining faithful with one's behavior to something one desires at the outset, such as being able to attend college or run a marathon, no matter how that desire came to be. Even when a goal is endogenous, faithfulness can be seen to be the critical factor, as a goal is only a reference point if one pays attention to it.[2]

Second, goals offer individuals concrete and visualizable outcomes which, like the "candle in the window" in the REO Speedwagon song, have the potential to focus the attention and thereby make future returns salient in the present moment. An extensive psychological literature has shown that focusing on salient future objects reduces the discounting of future returns and increases success at tasks associated with a future orientation (Agnew et al. 1998; Peters & Büchel 2010; Benoit et al. 2011; Cheema & Bagchi 2011; Hershfield et al. 2011; Soman & Cheema 2011; Cheng et al. 2012; Song et al. 2013; van Gelder et al. 2013; Daniel et al. 2013a, 2013b, 2015; Kaplan et al. 2016; Stein et al. 2016; Green & Lynn 2017).

Third, the reference-point framing of goals belies the relative value to agents of incremental progress toward a meaningful outcome. Whereas a reference point implies an arbitrary binary according to which falling short of a discrete objective, even by an infinitesimal amount, is registered as a loss, actual goal-orientated behavior in many cases reflects more continuous satisfaction associated with moving "in the right direction." Weight loss and increased fitness are often valued even if the individual does not achieve nominal goals for pounds shed or miles run; and even if one fails to save the total amount one needs for college, one's options for stopgap funding improve as the gap is narrowed.

This paper proposes a theory of goal achievement by way of effort invested in focusing on the future. According to my theory, the individual in effect acts to keep her goal "in sight," making it salient compared to other stimuli so that its priority remains apparent and the resolve to achieve it is maintained. I employ a simple consumption-savings framework with a present-biased $\beta - \delta$ agent along the lines of Phelps & Pollak (1968) and Laibson (1997).

[1] The goal-gradient hypothesis in psychology has proposed similarly that the mere proximity of a goal fosters increased motivation. See, e.g., Hull (1932) and Kivetz et al. (2006).

[2] Existing literatures on both grit (e.g., Muenks et al. 2018, Lam & Zhou 2019, Tang et al. 2019) and self-regulation (e.g., Howell & Buro 2011, Day & Connor 2017) point to the central role of forms of behavioral faithfulness in sparking achievement.

The agent in my three-period model is represented as a sequence of "selves," each of whom take control of the decision-making at a different point in time (Pollak 1968, Peleg & Yaari 1973, Goldman 1980, Laibson 1997). Such an agent might initially plan to save for college, but then fail to follow through as a subsequent self falls prey to temptations to spend. In this context, I represent focusing effort as a discretionary increase in the exponential discount factor δ that applies to the agent's next-period self.

I find that, when focusing is costless, it brings perfect commitment, overcoming entirely the effects of present bias and allowing the agent to fully achieve the goal. The greater the present bias in such circumstances, the more focusing effort is needed to keep the future in sight and reach full goal achievement. With costly focusing, the agent falls short of full commitment and falls correspondingly short of the goal. However, for a sufficiently low cost of focusing, the agent's progress toward the goal is increased as focusing cost falls over the relevant range. The greater the present bias, the more focusing effort is needed to achieve the same level of progress toward the goal; therefore, with costly focusing, greater present bias implies less progress, all else equal. None of these outcomes rely on reference-dependent utilities.

The paper belongs to a rich literature on psychological – or "soft" – commitment devices (e.g., Carrillo & Mariotti 2000 Bénabou & Tirole 2002, Bénabou & Tirole 2004, Bernheim & Rangel 2004; Bryan et al. 2010 provides a survey). More particularly, my work contributes to current research looking at focusing and self-control. In the support of long-term plans, an individual may pursue one of two focusing strategies: increase her focus on desired future outcomes, or work to prevent her attention from falling on sources of present-moment temptation. Ainslie (2021) considers how directing one's attention away from temptation (i.e., suppression) may aid the achievement of long-term plans. Cosentino et al. (2022) look at mental time travel, or the ability in essence to project oneself into the future, as a means to support long-term interests. Nagler (2023) develops an economic model in which focusing on the future is shown capable of substituting for the role of an illiquid asset, demonstrated by Laibson (1997), in enabling commitment to a consumption plan. The present paper is the first to provide an economic model of focusing as an effective means of commitment to a one-shot goal involving consumption/achievement at a specific future point in time rather than over time.

2 Model

Consider a model with a three-period structure (0, 1, and 2) similar to Koch and Nafziger (2011). A present-biased agent (i.e., one who exhibits $\beta-\delta$ discounting) has an exogenously-set goal involving a certain of amount of consumption in period 2; this goal is known to the agent from period 0 on. The agent in period 1 chooses an amount of consumption and saves the residual. Because period 2 is the terminal period, the period 2 agent simply consumes the inherited savings, augmented by interest and labor income, and so has no meaningful decision. The agent in period 0 recognizes the importance of the goal and, aware that present bias will interfere in the period 1 consume-or-save decision on which achieving the goal depends, acts to counteract her future distraction through focusing effort.

Formally, the period 1 agent earns labor income y_1 and gets access to an endowment x_0.

She chooses current consumption $c_1 \leq y_1 + x_0$. What she does not consume, she saves, thus

$$y_1 + x_0 - c_1 = x_1$$

where $c_1 \leq y_1 + x_0$ ensures $x_1 \geq 0$. This constraint rules out forced savings contracts (Laibson 1997).

The agent's savings yield a return $R = 1 + r$. In period 2, the agent earns labor income y_2, gets access to her savings $R \cdot x_1$. The period 2 agent consumes the sum of her income and savings, thus

$$c_2 = y_2 + R \cdot x_1 \quad = \quad y_2 + R \cdot (y_1 + x_0 - c_1)$$

The period 0 agent's focusing takes the form of choosing a discount factor, $\delta_1 \geq \delta$, which applies to the period 1 agent. In doing so, she incurs a marginal cost $\rho\delta_1^\theta \geq 0$ of increasing δ_1 above δ, where $\rho, \theta \geq 0$. Constant marginal cost and zero marginal cost are subsumed as a special cases of this function – $\theta = 0$ and $\rho = 0$, respectively.

Because the period 2 agent's decision is trivial, the model of the agent becomes simply that of two selves – those corresponding to periods 0 and 1 – playing a dynamic game, for which I seek subgame perfect equilibrium (SPE) joint strategies of the form (δ_1, c_1). The period 0 agent chooses δ_1 to maximize

$$\begin{aligned} U_0 &= \beta\delta \left[u\left(c_1\right) + \delta u\left(c_2\right) \right] \\ &= \beta\delta \left[u\left(c_1\right) + \delta u\left(y_2 + R \cdot (y_1 + x_0 - c_1)\right) \right] \end{aligned}$$

where I assume $u\left(.\right)$ continuous, twice-differentiable and concave, $\delta \in (0, 1]$ and $\beta < 1$. The $\beta - \delta$ discount function here is the standard quasi-hyperbolic approach to modeling a present-biased consumer (Phelps & Pollak 1968, Laibson 1997). The period 1 consumer in turn chooses $c_1 \leq y_1 + x_0$ to maximize

$$\begin{aligned} U_1 &= u\left(c_1\right) + \beta\delta_1 u\left(c_2\right) \\ &= u\left(c_1\right) + \beta\delta_1 u\left(y_2 + R \cdot (y_1 + x_0 - c_1)\right) \end{aligned}$$

3 Results

3.1 Costless Focusing ($\rho = 0$)

The equilibrium is solved by backward induction. The following theorem establishes the formal result that the costless focusing model has a unique equilibrium, and it characterizes this equilibrium. (The proof is obvious.)

Theorem 1. *Assume $\rho = 0$. The unique resource-exhausting joint strategy of the game is (δ_1^*, c_1^*) with $\delta_1^* = \frac{\delta}{\beta}$ and c_1^* maximizing U_0.*

The theorem implies that focusing effort achieves full commitment to the goal when focusing is costless: the period 0 self induces perfect compliance of the period 1 self with the desired consumption path. It is also evident that the greater the present bias, the more

focusing effort – whence higher δ_1 – is needed to achieve full commitment to the goal. This, too, is intuitive: an agent who knows she is more temptable or distractable must be more "laser-like" in her focus on the future to overcome this tendency. Finally we note that if $\delta > \beta$, it follows that $\delta_1^* > 1$. This does not mean that the agent values the future more than the present (because, of course, δ_1 multiplies β); it merely characterizes the range of possible values for δ_1^* as being outside the normal range of exponential discount factors.

3.2 Costly Focusing ($\rho > 0$)

My main result for costly focusing follows from Theorem 1, recognizing that the marginal net benefit of increasing δ_1 at the $\rho = 0$ optimum is zero:

Corollary 1. *The unique resource-exhausting joint strategy given $\rho > 0$ entails $\delta_1^{**} < \frac{\delta}{\beta}$.*

A direct implication is that the $\rho > 0$ agent falls short of full commitment to the goal. If the cost parameter ρ is low enough, then as the cost falls within the relevant range the agent's progress toward the goal is increased. (For ρ sufficiently high there may be a range over which a decline in focusing cost results in no incremental progress.) A final implication of Corollary 1 – that the greater the present bias, the more focusing effort is needed to achieve the same level of progress toward the goal – generalizes an implication of the Theorem.

4 Conclusion

I model the use of focusing effort by a present-biased agent to maintain commitment to an exogenous goal. I find that focus directed at a goal, when costless to the agent, achieves full commitment, a result that does not depend on the goal being a reference point. The notion that individuals, aware of their natural laziness with respect to the importance of the future, sense they must *work* to have "the end in mind" accords with intuition and is consistent with the advice experts give them.[3] That they fall short of doing so when focusing is costly suggests the relevance of bandwidth constraints to maximizing behavior and points toward bandwidth-cognizant policy solutions.

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[3] See, for example, Covey (1989), pp. 95-144.

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