Eyes on the Prize: The Preference to Invest Resources in Goals Over Means

Franklin Shaddy and Ayelet Fishbach
University of Chicago Booth School of Business

Goal systems are hierarchical, often requiring people to invest resources vertically—both in lower-order means and higher-order goals. For example, a college student who wants to take a particular class (a goal) might first have to take a prerequisite (the means). We investigated how the hierarchical configuration of goals and means affects preferences for vertical resource allocation. Specifically, we found that within goal–means dyads, people preferred to shift resources toward goals (i.e., invest less in means and more in goals) and further invested more resources in items framed as goals (versus means; Studies 1–2). The preference to shift resources toward goals was moderated by the presence of a goal–means hierarchy within the dyad (Study 3) and mediated by the perception that investing resources in the goal was a more direct investment in goal attainment (Study 4). Moreover, people chose to reduce costs associated with means (versus goals; Study 5) and were happier when costs associated with means (versus goals) were eliminated (Study 6). These studies demonstrate that the aversion to investing resources in means can result in non-normative decision making in the course of goal pursuit.

Keywords: decision making, goal systems, motivation, resource allocation

Supplemental materials: http://dx.doi.org/10.1037/pspa0000127.supp

Goal pursuit often demands that people invest resources—requiring them to spend money, spend time, exert effort, and so on—both in various means that facilitate goal attainment and in goals themselves. For example, students need to decide how much effort to invest studying for both prerequisites (investing in means) and classes they want to take (investing in goals). Home chefs need to decide how much time and effort to put into making both a practice meal before a dinner party (a means) and the dinner party meal itself (the goal). Marathon runners need to decide how much to practice and pay for both qualifying races (means) and the actual Boston Marathon (the goal). In these situations, how do people allocate resources between goals and associated means?

Goal systems are organized hierarchically, such that higher-order goals, which sit atop the hierarchy, are served by lower-order means (or subgoals). Goal pursuit, therefore, often requires people to invest resources vertically, both in various means that facilitate goal attainment, as well as in the goal directly. Previous research has explored the allocation of resources horizontally, between various means to a given goal, and documented a preference for instrumental means—activities that have fewer substitutes (Kruglanski et al., 2002). However, existing work has not examined the allocation of resources vertically, between the higher- and lower-order elements of the goal system. To that end, in this research, we explore whether, given the opportunity, people will shift resources away from means and toward goals, even when doing so would be inconsequential or costly.

Goal Systems: The Configuration of Goal-Means Relationships

In the structure of goal systems, means are fundamentally oriented toward goals (i.e., means serve goals). As such, means derive their value from goals—people value means to the extent that they value the goals that means serve (Fishbach, Shah, & Kruglanski, 2004; Kruglanski et al., 2002). Goals and means are further defined with respect to each other. So, for example, a math prerequisite might serve as a means by which a college student can achieve the goal of taking an accounting class. Individuals would therefore be willing to invest resources in this means (e.g., spend time studying, pay tuition, walk across campus) when it facilitates the goal of taking the accounting class. Of course, it is also possible that the accounting class itself serves as a means for yet another goal—taking a finance class, for example. Here, people would similarly be willing to invest resources in the accounting class when it facilitates another goal higher in the hierarchy.

The architecture of goal systems further involves means that serve multiple goals (in a multifinal configuration) and goals that are served by multiple means (in an equifinal configuration). This structure, in turn, creates meaningful implications for decision makers (e.g., Fitzsimons & Finkel, 2010; Kruglanski, 1996; Orehek, Mauro, Kruglanski, & van der Bles, 2012; van Osselaer & Janiszewski, 2012). For example, the number of goals associated with a particular means (in

Franklin Shaddy, Department of Marketing, University of Chicago Booth School of Business; Ayelet Fishbach, Department of Behavioral Science and Marketing, University of Chicago Booth School of Business.

Data and materials are available at https://osf.io/ytruw.

Correspondence concerning this article should be addressed to Franklin Shaddy, who is now at the UCLA Anderson School of Management, 110 Westwood Plaza, Los Angeles, CA 90095. E-mail: franklin.shaddy@anderson.ucla.edu

a multifinal configuration) weakens (i.e., dilutes) the association between that means and any individual goal. This can result in decreased resource investment in, and choice share of, such a means for people who are only interested in pursuing a single goal (Zhang, Fishbach, & Kruglanski, 2007). Furthermore, when only one goal is at stake, the preference for unifinal versus multifinal means can depend on self-regulatory mode. Specifically, locomotion leads to greater preference for unifinal means, whereas assessment leads to greater preference for multifinal means (Orehek et al., 2012). Moreover, as people make progress toward goal attainment, their preferences for means change such that they reject means that were once useful, but are no longer needed. For example, people will reject a friend when that friend is no longer instrumental to one's goals (Fitzsimons, Finkel, & Vandellen, 2015; Hofmann, Finkel, & Fitzsimons, 2015; Laurin et al., 2016).

Previous research, inspired by goal systems theory, has explored why people might choose to invest resources in one means versus another, requiring a *horizontal comparison* (i.e., across several means). The preference for investment in a particular means has been shown to depend on the number of available means (i.e., equifinality) and the number of salient goals (i.e., multifinality). In this research, however, we address a different question. Specifically, in goal systems, resources often need to be invested across lower-order means *and* higher-order goals, requiring a *vertical comparison*. When allocating resources between the higher- and lower-order elements of the goal system, are people strategic about whether to directly invest resources in a goal or indirectly invest resources in a means to achieve a goal?

The Preference to Invest Resources in Goals

In some situations, people can only invest in a means to achieve a goal, foreclosing on the possibility to invest resources directly in the goal. For example, a college student may take classes (the means) to become a college graduate (the goal). In this case, an abstract goal defines the purpose of studying and cannot be pursued directly (i.e., without means). However, many situations exist in which people need to allocate resources across both goals and means vertically. For example, underneath the goal to graduate college, our college student may hold the goal to take a specific accounting class, and this goal, in turn, may be supported by a math prerequisite. Resources (e.g., time spent studying, money spent on tuition, effort exerted traveling to class) would need to be invested in each. Therefore, when she studies for, spends money on, and travels to the math prerequisite, she is investing resources in the means; when she studies for, spends money on, and travels to the accounting class, she is investing resources in the goal. In this situation, the distinction between different types of vertical resource investment is salient, and resources can concretely be invested in both goals and means. Here, the preference to invest resources in goals should matter. Therefore, to isolate preferences for vertical resource allocation (i.e., between goals and means), we examine situations in which people must allocate resources across goal–means dyads.

Normatively, people should be indifferent about the proportion of resources invested in the goal versus the means within any particular goal–means dyad, holding total resource allocation and goal attainment constant. However, we propose that the architecture of goal systems systematically affects preferences for resource allocation, such that people prefer to shift resources from means to

goals. Thus, we predict: *Within a goal–means dyad, people prefer to invest less in means and more in goals*.

Often, people are able to choose how to allocate resources between means and goals. Yet, in some extreme situations, people can invest only in a means to achieve a goal (where 100% of the investment is shifted to the means) or invest only in the goal (where 100% of the investment is shifted to the goal). We predict that even in this extreme case, people would be willing to invest less in a means that is paired with a goal than in just the goal itself, despite obtaining objectively more in the former case. That is, shifting all resource investment to a means decreases the attractiveness of the goal–means dyad. So, for example, we predict that people will be willing to pay less to purchase a bag (a means) that delivers a free book (the goal), compared with purchasing the same book in isolation—despite the fact that the means has positive value (i.e., a bag is a multifinal means that can be used to deliver all sorts of goods). To offer another example, people may pay less for a two-drink minimum at a free comedy show (where 100% of the investment is shifted to the means), compared with paying for the same comedy show in isolation (where 100% of the investment is shifted to the goal).

Furthermore, it is also often the case that a single item or activity can both represent a goal and serve as a means to achieve another goal. It follows from our account, therefore, that holding constant the item or activity itself, resource investment will be higher when it is presented as a goal versus a means. So, for example, we predict that the amount of time students would be willing to spend studying for a class will be lower when that class serves as a prerequisite (i.e., it serves as a means), compared with when it represents their major (i.e., it serves as a goal). That is, the same class would elicit greater resource investment when construed as a goal than when construed as a means.

Finally, our theory suggests that the presence of a goal–means hierarchy within a dyad will moderate the preference for shifting resource investment. Only when a goal–means hierarchy characterizes the elements of a dyad (e.g., when one item or activity serves as the means by which another item or activity can be achieved) will people prefer to shift resources (i.e., invest more in) the item or activity associated with the goal.

But why might people prefer investing in goals over means? In the architecture of goal systems, goals sit atop the hierarchy. This structure implies that whenever people are required to invest resources across goals and means, they should perceive investing resources in goals as a direct investment in goal attainment (i.e., higher in the goal hierarchy). Investing resources in means, on the other hand, should be perceived as an indirect investment (i.e., lower in the goal hierarchy). To that end, within a particular goal–means dyad, the preference to invest resources in goals, rather than means, will be mediated by the perception that investing resources in the goal is a more direct investment in goal attainment.[1]

Finally, a number of implications for decision making follow from our account. Often resource investment is perceived as a cost

---

[1] Notably, the distinction between direct and indirect investment differs from the distinction between higher and lower instrumentality. Instrumentality depends on the horizontal number of substitutable means (e.g., fewer substitutable means increases instrumentality and vice versa). Directness of resource investment, however, captures the vertical positioning of resource investment. That is, resource investment is direct when it occurs higher in the goal hierarchy and indirect when it occurs lower in the hierarchy.

(i.e., people must spend money, time, effort, etc.). Therefore, we predict that when given the opportunity, people will choose to reduce costs associated with means, compared with costs associated with goals. Choosing to reduce costs associated with means shifts the relative balance of resource investment toward goals. Similarly, this preference should affect the subjective experience of goal pursuit. To that end, we also predict that when costs associated with means are reduced or eliminated, people will be happier than when costs associated with goals are reduced or eliminated.

Taken together, these hypotheses provide theoretical insight regarding how the architecture of goal systems systematically affects preferences for resource allocation across goals and means. To test these hypotheses, we conducted six studies that operationalized resource investment as willingness to invest money or spend time. We note, however, that conceptually, our account extends to all forms of resource investment. Studies 1–2 test the basic effect (shifting resources from means to goals); Study 3 examines moderation of the effect by the presence of a goal–means hierarchy within a dyad; Study 4 explores the mediating role of perceptions of direct (versus indirect) investment in goal attainment (measuring willingness to spend time planning); and Studies 5–6 highlight implications that follow from our account (measuring choice likelihood and anticipated happiness).

We sought to maximize power across all studies by targeting a minimum sample of 100 participants per cell. Power analyses conducted in G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) for each study showed that based on the respective sample sizes and target alpha level ($\alpha = .05$), power was sufficient across all studies (i.e., $\geq .80$) to detect a small to medium effect (e.g., $d = .35$, $\eta_p^2 = .035$). The studies in this paper incorporate data from both American participants recruited online and university students recruited in person. All studies reported also received IRB review and approval, and all surveys and data have been posted to an online repository (https://osf.io/ytruw). Finally, for all studies, we also report every independent and dependent variable, and we further report participant attrition in the Appendix (Zhou & Fishbach, 2016).

Study 1: Paying More for Goals

We designed Study 1 to examine whether people are more willing to invest resources in goals than in means. We manipulated, within a given pair of products, which item was perceived to be the goal and which item was perceived to be the means. We operationalized resource investment as willingness to pay (WTP) and elicited actual WTP for the items in a real auction. Specifically, we conducted a second-price auction (Vickrey, 1961) for both a chef's knife and a cutting board. Our main prediction was that participants would express greater WTP for the item perceived to be a goal, compared with the item perceived to be a means. We also predicted that holding constant the item itself, resource investment for each item would be higher when it was presented as a goal, compared with when the same item was presented as a means.

Method

Participants. Based on a previous version of this study, which used the same paradigm and revealed an estimated effect size of

$d = .40$ (see Supplemental Study 1), we conducted a separate power analysis for this specific study using G*Power (Faul et al., 2007). This analysis suggested that a sample of 400 participants would be required to achieve power of .80 at $\alpha = .05$, to detect two between-subjects effects (i.e., one for each item). We opened a HIT for 400 assignments on Amazon Mechanical Turk (MTurk). A total of 415 workers ($M_{age} = 34.82$; 236 females, 179 males) participated in exchange for $0.25.

Procedure. Study 1 employed a 2 (goal: chef's knife versus cutting board; between-subjects) $\times$ 2 (valuation target: chef's knife WTP versus cutting board WTP; within-subjects) mixed design. To manipulate which item would be perceived as the goal, all participants read at the outset that the study was intended to gauge consumer demand for a target product: either "an 8-inch chef's knife" (in the chef's knife condition) or "a walnut cutting board" (in the cutting board condition). We expected that this subtle manipulation would lead participants to adopt the focal item in the study as their goal. In the chef's knife (cutting board) condition, participants further read: "To gauge consumer demand for this product, we are actually selling this chef's knife [cutting board] as part of this survey. That is, we are providing you with the opportunity to actually purchase this chef's knife [cutting board] from us." Participants then viewed a picture and corresponding description of the goal (i.e., either the chef's knife or the cutting board). Importantly, to limit the potential that our goal manipulation affected inferences about market prices, we also presented the retail price of each item, which we held constant ($39.99).

We next introduced the means, along with a picture and corresponding description. Specifically, to present one item (either the cutting board or chef's knife) as a means for the other item (either the chef's knife or cutting board), the instructions stated: "To use the chef's knife [cutting board], you should also have a cutting board [chef's knife]. In other words, the cutting board [chef's knife] is the means by which you can achieve the goal of using the chef's knife [cutting board]. Therefore, we will auction off a cutting board [chef's knife], as well." These instructions implied that the cutting board (chef's knife) should serve as a means.

Next, participants reviewed the auction procedure for each item. Participants read: "We will be auctioning this chef's knife [cutting board] to the highest bidder, from among all people participating in this study today." Participants learned that the person who won the auction would pay only the price of the second-highest bidder: "This form of auction is called a 'second-price auction' and incentivizes you to offer your true willingness to pay." Finally, participants answered four questions to ensure that they understood the instructions (e.g., participants confirmed that "for each item, the person who offers the highest bid for each product will win the auction"). On the same page, participants then submitted their WTP for each item, first for the goal and then for the means ("How much are you willing to pay to acquire this [item]?"). We subsequently contacted the winning bidders for each of the two auctions to facilitate the sale according to the procedure outlined above.

Results and Discussion

Prior to analyzing the data, we removed five outliers. We defined an outlier as any observation exceeding the predetermined cutoff of three standard deviations above the mean for each prod-

uct. This exclusion criterion was established a priori and similarly applied to all subsequent studies with open-ended measures of WTP, prior to any data analysis.

An ANOVA of WTP on goal (chef's knife versus cutting board) × valuation target (chef's knife WTP versus cutting board WTP) revealed no main effects, $Fs < 1$, and the predicted two-way interaction, $F(1, 408) = 58.04$, $p < .001$ (see Figure 1). Specifically, within the chef's knife condition, participants expressed greater WTP for the chef's knife ($M = \$17.17$, 95% CI [$15.38, $18.96]) than for the cutting board ($M = \$14.43$, 95% CI [$12.72, $16.14]), $F(1, 408) = 29.98$, $p < .001$, $\eta_p^2 = .068$. Within the cutting board condition, participants expressed greater WTP for the cutting board ($M = \$16.81$, 95% CI [$14.96, $18.67]) than for the chef's knife ($M = \$14.04$, 95% CI [$12.24, $15.83]), $F(1, 408) = 28.15$, $p < .001$, $\eta_p^2 = .065$. Thus, participants expressed greater WTP for the item perceived to be a goal, compared with the item perceived to be a means (i.e., they preferred shifting costs from means to goals).

We also analyzed whether participants expressed greater WTP for each item when it was perceived to be the goal, compared with when the same item was perceived to be a means. Specifically, participants expressed greater WTP for the chef's knife when it was presented as a goal ($M = \$17.17$, 95% CI [$15.38, $18.96]) than when the same item was presented as a means ($M = \$14.04$, 95% CI [$12.24, $15.83]), $F(1, 408) = 5.94$, $p = .015$, $\eta_p^2 = .014$. Similarly, participants expressed greater WTP for the cutting board when it was presented as a goal ($M = \$16.81$, 95% CI [$14.96, $18.67]) than when the same item was presented as a means ($M = \$14.43$, 95% CI [$12.72, $16.14]), $F(1, 408) = 3.49$, $p = .063$, $\eta_p^2 = .008$. Thus, holding constant the item and manipulating its status as a goal or a means systematically affected its valuation.

In a real auction for real products, we held constant the item and manipulated only its status as a goal or a means. As predicted, participants expressed greater WTP for the item perceived to be a goal, compared with the item perceived to be a means. Moreover, holding constant the item itself, valuation for each item depended on its perception as a goal versus a means. Importantly, the descriptions of each item offered the same retail price, eliminating the potential alternative explanation that the goal manipulation affected inferences about retail prices. See Supplemental Study 1 for a conceptual replication with different items.

With initial evidence that people are more willing to invest resources in goals than in means, we designed Study 2 to test whether people are willing to invest less in a means that is paired with a goal than in just the goal itself.

Study 2: Paying More for Less

People often either pay for goals directly (where 100% of the investment is shifted to the goal) or pay for means to acquire goals indirectly (where 100% of the investment is shifted to the means). Many real-world examples follow this latter pricing format. For example, infomercials sometimes offer free products, but consumers have to pay for shipping; a two-drink minimum is often required to see an otherwise free comedy show; visitors to certain museums (e.g., the Metropolitan Museum of Art in New York City) sometimes have to make a donation, even when admittance is technically free.

We predict that in these situations people are willing to invest less in a means that is paired with a goal than in just the goal itself. Importantly, when means are valuable in and of themselves, expressing this preference would be economically costly (i.e., a goal paired with a means is more valuable than the same goal in isolation). To test this prediction, in Study 2, we conducted a second-price auction (similar to Study 1) for an autographed book. Participants either submitted bids for the autographed book (i.e., paying for the goal) or submitted bids for a branded tote bag that contained the autographed book (i.e., paying for a means paired with the goal). That is, we held constant a single goal and manipulated whether resource investment would be direct or indirect. We predicted that participants would express greater WTP when paying for just the goal itself, despite acquiring objectively less.

Method

Participants. We recruited MBA students in exchange for a health bar. We planned to collect as many participants as possible before the conclusion of the academic quarter (in one week). We were able to successfully recruit 83 participants ($M_{age} = 31.64$; 21 females, 62 males).

Procedure. Study 2 employed a single-factor (payment target: goal versus means), between-subjects design, in which we offered MBA students the opportunity to acquire a hardcover copy of a book that had been autographed by the author, a well-known professor in the business school (with whom MBA students are very familiar).[2] Those assigned to the goal condition were asked for their WTP for the autographed book, whereas those assigned to the means condition were asked for their WTP for a branded tote
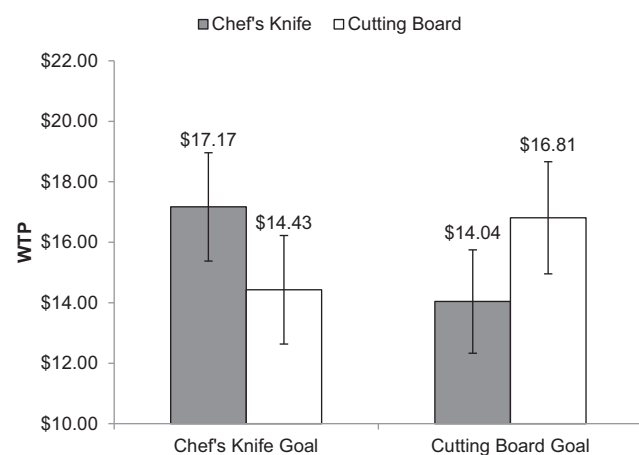

Figure 1. Results from Study 1: WTP for a chef's knife and a cutting board when each item was framed as a goal versus a means. Within the goal–means dyad, participants expressed greater WTP for the item perceived to be the goal, compared with the item perceived to be the means. Furthermore, participants expressed greater WTP for each item when it was perceived to be a goal, compared with when the same item was perceived to be a means. Bars represent 95% confidence intervals.

bag that contained the autographed book. Thus, in the means condition, participants expressed their WTP for a means paired with the goal. Consequently, bids in the means condition reflected WTP for both items. In the goal condition, participants expressed their WTP for only the goal. Therefore, bids in the goal condition reflected WTP for just the book.

A research assistant approached MBA students between classes at the University of Chicago to participate in our study. The first page of the survey contained questions about familiarity with and interest in behavioral economics (the topic of the book). The second page of the survey elicited bids from participants. In both conditions, we presented an image of the book, and participants read: "We have a hardcover copy of *Misbehaving: The Making of Behavioral Economics* that has been autographed by the author, Richard Thaler, and we would like to give you the opportunity to win the autographed book." In the goal condition, participants read: "The person who offers the highest bid for the autographed book will receive the autographed book." In the means condition, we also presented an image of a tote bag, and participants read: "To win the book, you need to purchase this Chicago Booth tote bag. The person who offers the highest bid for the tote bag will receive the autographed book delivered in the tote bag."

As in Study 1, participants then learned about the second-price auction and listed their WTP. At the time the study was conducted, the retail price of a hardcover copy of the book was $15.70, whereas the retail price of the tote bag from the university bookstore was $16.98 (we did not inform participants of these prices). After completing data collection, we contacted the winning bidder to facilitate the sale according to the procedure outlined above.

One potential concern with this procedure is whether participants in the means condition understood they were bidding for a means and a goal (e.g., the tote bag and the autographed book). If participants thought they were bidding for only the tote bag, their bids might have been suppressed, relative to the goal condition. To address this possibility, we recruited 24 additional MBA students (M_{age} = 29.46; 7 females, 17 males) in the same location as the main study. We presented participants with the instructions from the means condition and asked: "If we were actually giving away a free autographed book delivered in the Chicago Booth tote bag, and if you actually submitted the winning bid, which of the following would be true?" Participants chose between: "I would win only the tote bag" and "I would win the tote bag and the free autographed book." The overwhelming majority of participants (92%) selected the correct answer (e.g., "I would win the tote bag and the free autographed book"), suggesting participants were not confused about the instructions.

Results and Discussion

Prior to analyzing the data, we removed two outliers (see Study 1). As predicted, participants expressed greater WTP for just the book (goal condition: M = $23.38, 95% CI [$17.24, $29.51]), compared with WTP for the tote bag paired with the book (means condition: M = $12.18, 95% CI [$7.06, $17.31]), $t(79)$ = 2.84, p = .006, d = .60. Thus, despite the opportunity to acquire objectively more in the means condition (e.g., a tote bag and the autographed book), compared with the goal condition (e.g., just the autographed book), participants nevertheless expressed greater WTP when paying for only a goal. We argue that because people

are more willing to invest resources in goals than in means, they will "pay more for less" in situations that require paying for goals directly, compared with situations that require paying for means to acquire goals indirectly.

Notably, from a purely economic standpoint, this result implies that designation as a means can create negative utility, which is subsequently reflected in valuation. Specifically, participants were willing to pay, on average, $11.20 less for the tote bag and the book than for just the book. Strictly speaking, therefore, the value of the tote bag when construed as a means was –$11.20.

Next, with evidence that people are sensitive to how resources are allocated across goals and means (Studies 1–2), we designed Study 3 to test whether the presence of a goal–means hierarchy moderates the preference for investing resources in the goal.

Study 3: Spending Time

In Study 3 we presented participants with two news articles and manipulated whether the articles formed a goal–means dyad (i.e., the first article served as the means by which participants could achieve the goal of understanding the second article) or represented separate goals (i.e., participants maintained separate goals to read each article). We then measured a nonmonetary form of resource investment: allocation of time (to read each article). We predicted that the presence of a goal–means hierarchy within the dyad would moderate the preference to shift resources from one article to another. Specifically, we predicted that participants would spend less time reading the first article (the means) than the second (the goal). In contrast, our pretesting of the articles suggested that at baseline (i.e., when both articles were presented as goals), participants tended to spend more time reading the first article than the second. We also predicted that holding constant the first article itself, resource investment would be higher when it was presented as a goal, compared with when the same article was presented as a means.

Method

Participants. We opened a HIT for 200 assignments on MTurk. A total of 217 workers (M_{age} = 35.89; 140 females, 77 males) participated in exchange for $0.50.

Procedure. Study 3 employed a 2 (relationship: goal–means versus control; between-subjects) $\times$ 2 (article: first versus second; within-subjects) mixed design, in which participants spent time reading an article about the opioid and heroin epidemic in the United States (the first article) and another article about the recent fall in life expectancy in the United States (the second article).

In the control condition, participants read: "This session contains two studies: Understanding the Opioid and Heroin Epidemic in the U.S. (pays $0.25) [and] Understanding the Recent Fall in U.S. Life Expectancy (pays $0.25)." They further read that their goal was to learn about each of these issues. Participants then elaborated on the importance of reading each article: "Please briefly explain the importance of your goals to understand both the opioid and heroin epidemic and the recent fall in life expectancy in the United States."

In the goal–means condition, participants read: "This session contains one study: Understanding the Recent Fall in U.S. Life Expectancy (pays $0.50)." They further read that their goal was to

learn about the recent fall in life expectancy and that learning about the opioid and heroin epidemic would help them achieve this goal (because part of the recent fall in life expectancy can be attributed to the opioid and heroin epidemic). Participants then elaborated on the goal–means hierarchy between the articles: "Please briefly explain how understanding the opioid and heroin epidemic in the United States can help you achieve your goal of understanding the recent fall in life expectancy in the United States."

Next, we told participants that they would have five total minutes to read both articles. We then asked them to allocate their available time to each article, using a four-point scale (ranging from [1 min to the first article/4 min to the second article] to [4 min to the first article/1 min to the second article]). We told participants that we would actually limit the time they could spend reading each article, based on this choice.

We then presented all participants with a Vox.com "explainer" article describing the opioid and heroin epidemic in the United States (the first article). The next page contained a Vox.com "explainer" article describing the recent fall in life expectancy in the United States (the second article; see Appendix for stimuli). Each web page contained the article, a countdown clock displaying the time remaining, and a continue button that participants could click at any time. We subsequently measured the time participants spent reading each article.

After reviewing each article, participants evaluated it by answering four questions (e.g., "How [informative/convincing/credible/insightful] was the article on the previous page?"; *not at all* = 1; *very* = 7). Responses to these questions were irrelevant to the hypothesis and not analyzed.

Results and Discussion

On average, participants spent roughly two minutes reading each article ($M_{\text{first article}}$ = 115.05 seconds, interquartile range: [81.82, 152.41]; $M_{\text{second article}}$ = 108.15 seconds, interquartile range: [79.41, 120.04]). Because the time spent reading each article was skewed (for the first article, $\chi^2(2)$ = 13.21, p = .001; for the second article, $\chi^2(2)$ = 9.56, p = .008), we log-transformed the number of seconds that each participant spent reading.

An ANOVA of time spent reading on relationship (goal–means versus control) × article (first versus second) revealed no main effect of relationship, $F(1, 215)$ = 2.67, p = .104, and a main effect of article, $F(1, 215)$ = 3.70, p = .056, η_p^2 = .017, such that participants spent more time reading the first article (M = 4.66 log-seconds, 95% CI [4.59, 4.72]) than the second article (M = 4.59 log-seconds, 95% CI [4.53, 4.66]). Critically, testing our main hypothesis, we also observed the predicted two-way interaction, $F(1, 215)$ = 21.99, p < .001 (see Figure 2), consistent with moderation of the effect. Specifically, in the goal–means condition, participants spent more time reading the second article (M = 4.63 log-seconds, 95% CI [4.53, 4.73]) than the first article (M = 4.53 log-seconds, 95% CI [4.44, 4.62]), $F(1, 215)$ = 3.99, p = .047, η_p^2 = .018. We observed the opposite pattern in the control condition (as well as in the pretest), wherein participants spent more time reading the first article (M = 4.79 log-seconds, 95% CI [4.70, 4.89]) than the second article (M = 4.56 log-seconds, 95% CI [4.46, 4.66]), $F(1, 215)$ = 20.99, p < .001, η_p^2 = .089. Thus, imposing a goal–means hierarchy on the two articles
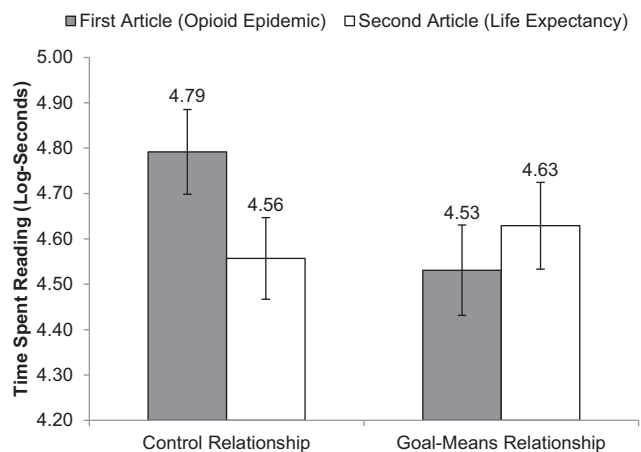

Figure 2. Results from Study 3: Time spent reading each article when the articles formed a goal–means dyad or represented separate goals. When both articles were presented as goals (control condition), participants spent more time reading the first article than second. However, when we imposed a goal–means hierarchy on the articles (goal–means condition), participants spent more time reading the second article (the goal) than the first (the means). Furthermore, participants spent more time reading the first article when it was perceived to be a goal, compared with when the same article was perceived to be a means. Bars represent 95% confidence intervals.

caused people to reverse their baseline preference for time investment across the elements of the dyad.

Moreover, because we manipulated the status of the first article as either a goal or a means, we also analyzed whether participants spent more time reading the first article when it was perceived to be a goal, compared with when it was perceived to be a means. Consistent with our account, participants spent more time reading the first article when it was presented as a goal (M = 4.79 log-seconds, 95% CI [4.70, 4.89]) than when the exact same article was presented as a means (M = 4.53 log-seconds, 95% CI [4.44, 4.62]), $F(1, 215)$ = 15.77, p < .001. This pattern conceptually replicates the effect observed in Study 1 (i.e., by holding constant an item and manipulating its status as a goal or a means).

Recall that we also asked participants to allocate their time (five minutes) between the two articles, to reinforce the tradeoff in resource allocation. Consistent with our account, participants in the goal–means condition chose to allocate more time to the second article (i.e., to the goal, rather than to the means; M = 2.56 min, 95% CI [2.43, 2.68]) than did participants in the control condition (M = 2.36 min, 95% CI [2.54, 2.46]), $t(215)$ = 2.44, p = .016, d = .33.

Study 3 isolated the causal role of goal architecture on the preference to invest resources in goals (rather than means) by manipulating whether participants elaborated on the goal–means hierarchy between two items. To that end, the presence of a goal–means hierarchy within the dyad moderated the preference for investing resources in the goal. Next, we designed Study 4 to test for mediation by perceptions of direct (versus indirect) investment in goal attainment.

Study 4: Mediation by the Perception of Direct (Versus Indirect) Investment

Our account suggests that people maintain the preference to invest resources in goals because investing resources in goals is perceived as direct investment (as opposed to indirect investment) in goal attainment. Thus, in Study 4, we predicted that the perception of direct (rather than indirect) investment would mediate the preference for investing resources in goals, rather than means. As in Study 3, we also manipulated whether participants elaborated on the goal-means hierarchy between two activities. We further employed a different measure of resource investment: willingness to spend time planning. Specifically, we asked participants who exercised regularly how much time they would be willing to spend planning each of two different activities, exercise and dieting, at the beginning of the year (as part of their New Year's resolutions). We then asked participants to rate their perceptions of resource investment in each activity as either direct or indirect investments. We predicted that those who perceived dieting as a means to achieve their exercise goal would be willing to invest more resources in planning their exercise regimen than their dieting regimen and that this difference would be mediated by the extent to which participants perceived planning an exercise regimen to be a more direct investment in goal attainment.

Method

Participants. To recruit participants who maintained goals relevant to the study, we first asked MTurk workers to respond to four screening questions. Three of these questions were irrelevant to the domain (e.g., "Do you have a dog?"). We included them to make it difficult for participants to guess our screening criterion (see Chandler & Paolacci, 2017). Only participants who responded affirmatively to the target screening question ("Do you currently maintain the goal to exercise regularly?") qualified to participate. We randomized the order of these questions for each participant. For those who qualified, we opened a HIT for 200 assignments on MTurk. A total of 225 MTurk workers (M_{age} = 34.66; 139 females, 85 males, 1 undisclosed) participated in exchange for $0.50.

Procedure. Study 4 employed a 2 (relationship: goal–means versus control; between-subjects) × 2 (investment target: dieting versus exercise; within-subjects) mixed design, in which participants considered different health activities (i.e., dieting and exercise) and decided how much time to spend planning each.

In the goal–means condition, participants first read: "Exercising regularly is the most common New Year's resolution in the United States. However, to exercise regularly, you need to maintain a healthy diet." Participants then elaborated on the goal–means hierarchy: "Please briefly explain how maintaining a healthy diet helps you achieve your goal of exercising regularly." In the control condition, participants first read: "Exercising regularly and maintaining a healthy diet are the most common New Year's resolutions in the United States." Participants then elaborated on the importance of each goal: "Please briefly explain the importance of your goals to exercise regularly and maintain a healthy diet."

All participants then answered: "Before 2018 starts, how much time would you be willing to devote to planning each of the following for the New Year?" We then listed "your dieting regi-

men" and "your exercise regimen" in random order, and participants responded on seven-point scales (not a lot of time = 1; a lot of time = 7). Note that this study was conducted with participants who maintained the goal to exercise regularly, in the month of December, when New Year's resolutions are presumably most salient.

Finally, we presented all participants with the following prompt: "When pursuing a goal, people can take different actions. Some actions help to directly achieve the goal. Other actions are indirect. They help people achieve something else that will eventually help them achieve the goal." Participants then answered, in random order: "Does planning your exercise regimen feel like it directly or indirectly achieves your goal?" and "Does planning your dieting regimen feel like it directly or indirectly achieves your goal?" Participants responded using seven-point scales (indirectly achieves my goal = 1; directly achieves my goal = 7).

Results and Discussion

An ANOVA of willingness to spend time on relationship (goal–means versus control) × investment target (dieting versus exercise) revealed no main effect of relationship condition, $F < 1$, and a main effect of investment target, $F(1, 223) = 16.34$, $p < .001$, such that participants were willing to spend more time planning their exercise regimen (M = 4.94, 95% CI [4.73, 5.15]) than their dieting regimen (M = 4.56, 95% CI [4.34, 4.77]). Consistent with the moderation observed in Study 3, we also observed the predicted two-way interaction, $F(1, 223) = 6.19$, $p = .014$ (see Figure 3). Specifically, in the goal–means condition, participants indicated they would be willing to spend more time planning the exercise regimen (M = 5.12, 95% CI [4.82, 5.41] than the dieting regimen (M = 4.50, 95% CI [4.19, 4.80]), $F(1, 223) = 21.01$, $p < .001$, $\eta_p^2 = .086$. This pattern disappeared in the control condition. Participants indicated that they would be willing to spend roughly
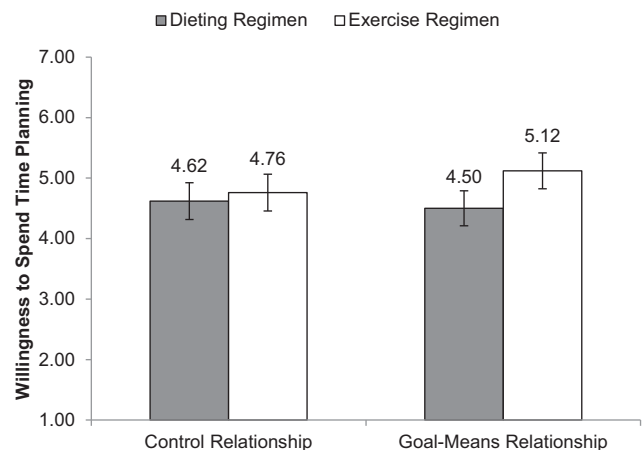

Figure 3. Results from Study 4: The presence of a goal–means hierarchy moderated the preference for investing resources in the goal. When both the dieting regimen and the exercise regimen were presented as goals (control condition), resource investment across the activities did not differ. However, when we imposed a goal–means hierarchy on the activities (goal–means condition), participants were willing to spend more time planning the exercise regimen (the goal) than the dieting regimen (the means). Bars represent 95% confidence intervals.

the same amount of time planning the exercise regimen ($M = 4.76$, 95% CI [4.47, 5.05]) and the dieting regimen ($M = 4.62$, 95% CI [4.31, 4.92]), $F(1, 223) = 1.11$, $p = .294$, $\eta_p^2 = .005$.

We also examined whether resource investment in each activity was perceived to be direct versus indirect investment in goal attainment. An ANOVA of investment perceptions on relationship (goal–means versus control) × investment target (dieting versus exercise) revealed no main effect of relationship condition, $F(1, 223) = 1.31$, $p = .254$, and a main effect of investment target, $F(1, 223) = 7.55$, $p < .001$, $\eta_p^2 = .033$, such that participants perceived spending time planning their exercise regimen to be more direct ($M = 5.60$, 95% CI [5.42, 5.79]) than spending time planning their dieting regimen ($M = 5.29$, 95% CI [5.08, 5.50]). Critically, we also observed the predicted two-way interaction, $F(1, 223) = 6.32$, $p = .013$. Specifically, in the goal–means condition, participants indicated that exercise felt more like a direct investment ($M = 5.66$, 95% CI [5.40, 5.91]) than dieting ($M = 5.05$, 95% CI [4.76, 5.35]), $F(1, 223) = 13.91$, $p < .001$, $\eta_p^2 = .059$. This pattern disappeared in the control condition. Participants indicated that exercise was as much a direct investment ($M = 5.55$, 95% CI [5.29, 5.81]) as dieting ($M = 5.53$, 95% CI [5.23, 5.82]), $F(1, 223) = .03$, $p = .869$, $\eta_p^2 = .000$.

We next performed a mediation analysis to test our main hypothesis—that the effect of relationship condition on the difference in resource investment across each item would be mediated by the extent to which participants perceived exercise to be a more direct investment than dieting. First, we calculated, for each participant, the difference between time willing to spend planning the exercise regimen and time willing to spend planning the dieting regimen. Higher scores on this variable indicate that participants were willing to spend more time planning their exercise regimen. We similarly calculated the difference between the perception of exercise as a direct investment and the perception of dieting as a direct investment. Higher scores on this variable indicate that participants perceived exercise to be a more direct investment than dieting. We used the bootstrap procedure, with 20,000 resamples (Preacher, Rucker, & Hayes, 2007). As predicted, investment perceptions significantly mediated the effect of relationship condition on the difference in resource investment across each item (indirect effect = .168, $SE = .09$, bias-corrected 95% CI [.030, .373], consistent with full mediation).

Finally, we also tested our secondary hypothesis—whether participants were willing to spend more time planning the dieting regimen when it was presented as a goal versus a means ($Ms = 4.62$ versus 4.50, respectively). Although this pattern was directionally consistent with the results of Studies 1 and 3 (i.e., where we similarly held constant an item and manipulated its status as a goal or a means), this difference was not significant, $F(1, 223) = .30$, $p = .584$, $\eta_p^2 = .001$. We note, however, that because we explicitly recruited participants who held the goal to exercise regularly, we believe it is likely that many of these participants already simultaneously held the goal to maintain a healthy diet. So, presenting a dieting regimen as a means in the goal–means condition likely did not suppress willingness to invest resources as much as in Studies 1 and 3, where we experimentally induced the goal–means relationship (rather than leveraging preexisting goals).

This study demonstrates that the perception of direct (rather than indirect) investment mediates the preference for investing resources in the goal, rather than a means, consistent with our

account. This study further conceptually replicates the findings from Study 3, showing that the presence of a goal–means hierarchy within a dyad moderates the preference for investing resources in the goal (rather than the means). Next, in Studies 5–6, we explore implications for decision making that follow from our account.

Study 5: People Choose to Eliminate Costs Associated With Means

If people are more willing to invest resources in goals, they should choose, when possible, to reduce costs associated with means, compared with equivalent costs associated with goals. To test this prediction, Study 5 (preregistered: https://aspredicted.org/qj2gz.pdf) leveraged real-world examples of goal–means dyads. Within each goal–means dyad, we examined different forms of monetary discounts (e.g., tuition waiver, credit, or promotional voucher). We predicted that across the different dyads participants would express a stronger desire to eliminate costs associated with means, thereby shifting resources toward goals.

Method

Participants. We opened a HIT for 300 assignments on MTurk. A total of 301 workers ($M_{age} = 37.81$; 165 females, 136 males) participated in exchange for $0.50.

Procedure. Study 5 employed a 2 (cost eliminated: goal versus means; within-subjects) × 3 (scenario: school versus marathon versus dinner; between-subjects) mixed design. Participants were randomly assigned to the school, marathon, or dinner scenario and then rated the extent to which they would prefer to use a tuition waiver, credit, or promotional voucher, respectively, on the cost of a goal and on the cost of a means. Importantly, in each scenario the cost of the means and the cost of the goal were the same.

Specifically, in the school scenario, participants read: "You are signing up for classes at the local business school for the upcoming academic year, and your goal is to take Advanced Accounting 401. The prerequisite for this class, however, is Basic Accounting 101. Therefore, to take Advanced Accounting 401, you need to take Basic Accounting 101." Participants then confirmed their goal (e.g., "Which of the following is your goal?") and read: "Tuition for Basic Accounting 101 is $250, and tuition for Advanced Accounting 401 is $250. You have never taken either class and are paying for both at the same time. You have a $250 tuition waiver, which you can use to eliminate the cost of either Basic Accounting 101 or Advanced Accounting 401 (but not both). Would you use the waiver on Basic Accounting 101 or on Advanced Accounting 401?" Participants indicated the extent to which they would be likely to use the waiver on the means (e.g., "Basic Accounting 101") and the goal (e.g., "Advanced Accounting 401"). For both items: *definitely would not use the waiver* = 1; *definitely would use the waiver* = 7.

In the marathon scenario, participants read: "You recently took up long-distance running as a hobby, and your goal is to run in the world-famous Boston Marathon. To qualify, however, you need to run in the local marathon in your hometown." Participants then confirmed their goal and read: "Registering for the local marathon costs $75, and registering for the Boston Marathon costs $75. You are registering for both right now. You have a $75 credit, which you can use to eliminate the cost of registering for either the local

marathon or the Boston Marathon (but not both)." Participants indicated the extent to which they would be likely to use the credit on the means (e.g., "the local marathon") and the goal (e.g., "the Boston Marathon"). For both items: *definitely would not use the credit* = 1; *definitely would use the credit* = 7.

In the dinner scenario, participants read: "You are throwing a dinner party later this week, and your goal is to cook a gourmet meal for friends visiting from out of town. You want to practice the recipe beforehand, however, so tomorrow you need to cook the same meal for your family." Participants then confirmed their goal and read: "Ingredients for the meal for your family will cost $125, and the same ingredients for the meal for your friends will cost $125. You are purchasing both this week. You have a $125 promotional voucher, which you can use to eliminate the cost of either the meal for your family or the meal for your friends (but not both). Would you use the voucher on the meal for your family or on the meal for your friends?" Participants indicated the extent to which they would be likely to use the voucher on the means (e.g., "the meal for family") and the goal (e.g., "the meal for friends"). For both items: *definitely would not use the credit* = 1; *definitely would use the credit* = 7.

Results and Discussion

An ANOVA of desire to eliminate costs on cost eliminated (goal versus means) × scenario (school versus marathon versus dinner) revealed the predicted main effect of cost eliminated, $F(1, 298) = 36.58$, $p < .001$, $\eta_p^2 = .109$. We did not observe a main effect of scenario, $F(2, 298) = 1.32$, $p = .268$, or two-way interaction, $F < 1$. Across the scenarios, participants indicated a greater desire to eliminate costs associated with means ($M = 5.10$, 95% CI [4.84, 5.36]) than costs associated with goals ($M = 3.58$, 95% CI [3.32, 3.85]). Moreover, this pattern persisted for each individual scenario (see Table 1).

These results demonstrate that when given the opportunity to reduce or eliminate costs associated with goals or means, people choose to reduce costs associated with means. We next examined whether people are also happier when shifting resources from means to goals.

Study 6: People Are Happier When Costs Associated With Means Are Eliminated

If people prefer to shift resources from means to goals, when costs associated with means are reduced or eliminated, people should also be more satisfied (i.e., happier), compared with when equivalent costs associated with goals are reduced or eliminated.

Put simply, if people actually prefer to invest resources in goals, this should make them happier. To test this prediction, in Study 6 (preregistered: https://aspredicted.org/2xj8n.pdf) we adapted the goal–means dyads used in Study 5, and we manipulated whether costs associated with means or goals were eliminated. We predicted that across the scenarios and despite holding overall costs constant, participants would be happier when costs associated with means were eliminated.

Method

Participants. We opened a HIT for 300 assignments on MTurk. A total of 302 workers ($M_{age} = 35.66$; 140 females, 162 males) participated in exchange for $0.25.

Procedure. Study 6 employed a 2 (cost eliminated: goal versus means; within-subjects) × 3 (scenario: school versus marathon versus dinner; between-subjects) mixed design. Participants were randomly assigned to the school, marathon, or dinner scenario. In each scenario, participants rated their expected happiness from eliminating the cost of a goal and eliminating the cost from a means. As in Study 5, in each scenario the cost of the means and the cost of the goal were the same.

Specifically, in the school scenario, participants read: "Tuition for Basic Accounting 101 is $250, and tuition for Advanced Accounting 401 is $250. You have never taken either class and are paying for both at the same time." Participants then confirmed their goal (e.g., "Which of the following is your goal?") and indicated how happy they would be if the means were free (e.g., "Basic Accounting 101") and if the goal were free (e.g., "Advanced Accounting 401"). For both items: *not at all happy* = 1; *very happy* = 7.

In the marathon scenario, participants read: "Registering for the local marathon costs $75, and registering for the Boston Marathon costs $75. You are registering for both right now." Participants then confirmed their goal and indicated how happy they be if the means were free (e.g., "the local marathon") and if the goal were free (e.g., "the Boston Marathon"). For both items: *not at all happy* = 1; *very happy* = 7.

In the dinner scenario, participants read: "Ingredients for the meal for your family will cost $125, and the same ingredients for the meal for your friends will cost $125. You are purchasing both this week. Suppose you win a promotion at the store." Participants then confirmed their goal and indicated how happy they would be if the promotion rendered the means free (e.g., "the meal for family") and if the promotion rendered the goal free (e.g., "the meal for friends"). For both items: *not at all happy* = 1; *very happy* = 7.

Table 1
Study 5: Mean [95% Confidence Interval] of Desire to Eliminate Costs Associated With Goals Versus Means

Scenario	Eliminate the cost of the goal	Eliminate the cost of the means	Difference	Sig.	Effect size
School	3.47 [3.02, 3.91]	5.10 [4.66, 5.54]	$F(1, 298) = 14.22$	$p < .001$	$\eta_p^2 = .046$
Marathon	3.60 [3.11, 4.09]	4.99 [4.50, 5.48]	$F(1, 298) = 10.19$	$p = .002$	$\eta_p^2 = .033$
Dinner	3.68 [3.23, 4.13]	5.21 [4.79, 5.63]	$F(1, 298) = 12.35$	$p = .001$	$\eta_p^2 = .040$

Note. Across scenarios, participants preferred to eliminate costs associated with means.

Results and Discussion

An ANOVA of satisfaction on cost eliminated (goal versus means) × scenario (school versus marathon versus dinner) revealed the predicted main effect of cost eliminated, $F(1, 299) = 12.92$, $p < .001$, $\eta_p^2 = .041$. We also observed an unpredicted marginally significant main effect of scenario, $F(2, 299) = 2.63$, $p = .074$, and no two-way interaction, $F < 1$. Across the scenarios, participants anticipated that they would be happier when the cost associated with the means was eliminated ($M = 5.53$, 95% CI [5.35, 5.71]) than when the cost associated with the goal was eliminated ($M = 5.06$, 95% CI [4.86, 5.25]). Moreover, this pattern persisted to varying degrees for each individual scenario (see Table 2).

These findings, coupled with the results of Study 5, suggest that people both prefer reducing costs associated with means (versus goals) and are happier when costs associated with means (versus goals) are eliminated. These results provide further evidence that people prefer to shift resources from means to goals, exhibiting a greater willingness to invest resources in goals than in means.

Single-Paper Meta-Analysis

Finally, we conducted a single-paper meta-analysis (McShane & Böckenholt, 2017). We included every test of our main hypothesis that within a goal–means dyad, willingness to invest resources will be higher for the goal than for the means (we also included data from two studies that we report in the Supplemental Materials). This analysis estimated the total effect size at 0.96, 95% confidence interval = [0.363, 1.559], thereby offering further empirical support for the robustness of the effect.

General Discussion

Resource investment is the most fundamental question for goal systems theory (Kruglanski et al., 2002). And whereas previous research has mainly examined *horizontal comparisons* between means (i.e., when people value means and why they might choose to invest resources in one means versus another), we examine *vertical comparisons* between goals and means. Specifically, in this research, we demonstrated how goal systems—the configuration of goal–means relationships—systematically affect preferences for vertical resource allocation, such that people prefer to directly invest resources in goals, rather than indirectly investing resources in means to achieve goals.

We tested our account across six studies, which used willingness to invest money and spend time as operationalizations of resource

investment. In Studies 1 and 2, we administered second-price auctions for real products, finding that people both paid more for an item presented as a goal (compared with an item presented as a means; Study 1) and paid more for only a goal (compared with a means that was paired with the goal; Study 2). Furthermore, participants were willing to pay more for an item when it was presented as a goal versus a means.

In Studies 3 and 4, we found that the presence of a goal–means hierarchy within a dyad moderated the preference for investing resources in the goal, rather than the means. This preference, in turn, was mediated by the extent to which investment in a goal was perceived as direct (rather than indirect) investment in goal attainment. And in Studies 5 and 6, we found that people chose to reduce costs associated with means (versus goals) and were happier when costs associated with means (versus goals) were eliminated.

Theoretical Implications

A number of implications of our account are worth highlighting. For example, based on our results, it is possible that to reduce costs associated with means, people might actually prefer a goal–means dyad that shifts more costs toward the goal—but requires a larger overall expenditure of resources—to a goal–means dyad that shifts more costs toward the means—but requires a smaller overall expenditure of resources. This is conceptually similar to Study 2, in which participants either invested in a goal or invested in a goal–means dyad. Consequently, aversion to investing resources in means could yield a non-normative preference for an objectively inferior pattern of resource expenditure in other goal–means dyads. For example, signing up for a life insurance plan (a goal) often requires scheduling a medical examination (the means), and people must call into busy customer service lines to schedule each (i.e., invest time). Our findings suggest, for instance, that willingness to wait 30 min on hold to sign up for the life insurance plan and 20 min on hold to schedule the medical examination (50 min total) might be higher than willingness to wait 10 min on hold to sign up for the life insurance plan and 30 min on hold to schedule the medical examination (40 min total).

We also note that the distinction between goals versus means is conceptually similar to the distinction between secondary versus primary goals, subgoals versus goals, and subordinate versus superordinate goals. Accordingly, in all these (and other) instances of vertical resource allocation, people should similarly maintain a preference for more direct investment (i.e., investing resources higher in the goal hierarchy).

Table 2

Study 6: Mean [95% Confidence Interval] of Anticipated Happiness When Costs Associated With Goals Versus Means Were Eliminated

Scenario	Cost of the goal eliminated	Cost of the means eliminated	Difference	Sig.	Effect size
School	5.13 [4.78, 5.48]	5.70 [5.36, 6.04]	$F(1, 299) = 6.35$	$p = .012$	$\eta_p^2 = .021$
Marathon	5.23 [4.87, 5.59]	5.55 [5.23, 5.88]	$F(1, 299) = 2.06$	$p = .153$	$\eta_p^2 = .007$
Dinner	4.81 [4.51, 5.11]	5.33 [5.05, 5.61]	$F(1, 299) = 5.16$	$p = .024$	$\eta_p^2 = .017$

Note. Across scenarios, participants anticipated greater happiness when costs associated with means were eliminated.

Moreover, in six studies we operationalized resource investment as investing money and spending time. These are standard measures of resource investment and facilitate direct comparison between goals and means. However, we emphasize that conceptually our predictions extend to all forms of resource investment (e.g., mental energy, social support, etc.). So, for example, people should be more willing to concentrate (i.e., use mental energy) or call in favors from family and friends (i.e., use social support) for higher-order goals than for lower-order means. Future work could examine these and related implications.

Importantly, one potential boundary condition for our account is whether people evaluate all available options simultaneously, rather than in isolation. Specifically, in the majority of our experimental paradigms, participants did not compare the various resource allocation schemes directly. For example, in Study 2, participants submitted bids for either an autographed book or for a branded tote bag that contained the autographed book. They did not view both options simultaneously, and we subsequently observed greater WTP for the just the autographed book. However, this pattern could reverse if participants considered the options side-by-side. People would recognize that WTP for two desirable items should be at least as high as WTP for a single desirable item. Thus, the anomalies that follow from the preference to invest in goals could be attenuated in situations where people are able to evaluate all available options simultaneously. However, we note that in goal pursuit, it is not typically the case that people consider various resource allocation schemes in this manner.

Finally, we emphasize that this theoretical account matters in the real world. For example, policymakers might increase receptiveness to infrastructure investment by describing these projects as goals in and of themselves (e.g., building a new train station that serves as a tourist destination), rather than as means to achieve something else (e.g., a way to connect to other cities). And people with health or academic goals might reframe various means (e.g., exercise, reading) as standalone goals to be pursued (e.g., exercising for enjoyment, reading for fun), worthy of additional resource investment. It is possible that part of the reason why focusing on intrinsic rewards is motivating is that it changes the perception of an activity from a means to a goal (Woolley & Fishbach, 2015).

Alternative Explanations

Several potential alternative explanations for our model are worth discussing. First, because our main measure in four of six studies involved monetary resource investment, one should consider the possibility that means might simply be worth less in the marketplace. For example, an item purchased online (a goal) typically costs more than the shipping and handling charges that accompany the order (the means). Therefore, people might be more willing to pay for goals because pricing norms define expectations of cost. We argue, however, that marketplace norms create expectations about specific items, but not a general expectation that means always cost less than goals. For example, an international flight is a common means to achieve the goal of vacationing abroad, and people are typically willing to pay high prices for them. Nevertheless, to address alternative explanations stemming from pricing norms, we held constant the item and manipulated its status as a goal or a means (Studies 1, 3, and 4) and also measured a nonmonetary form of resource investment (i.e.,

time; Studies 3 and 4). These findings do not follow from marketplace norms. We also employed scenarios in which the target items were priced equally or reference prices were not clear.

Second, whenever means cost less than goals in the marketplace, another potential account is that people are simply less sensitive to additional costs when they are added to more expensive items (e.g., goals), compared with when they are added to less expensive items (e.g., means). Therefore, in our studies, we set prices for goals and means equal to each other and allowed participants to reduce or eliminate costs associated with either (Study 5). We also demonstrated that people reported different levels of satisfaction, depending on whether a cost associated with a goal or a cost associated with a means was eliminated—even when these costs were identical and goals and means were priced equally (Study 6). Thus, it is unlikely that differences in marginal sensitivity to the costs of goals and means account for our results.

Third, a means paired with a goal can be construed as a bundle, which is defined in the economics literature as the sale of two or more separate products (i.e., goods or services) in one package (Stremersch & Tellis, 2002). Previous research has shown that when purchasing bundles, people prefer low-benefit components to be priced less than high-benefit components (Hamilton & Srivastava, 2008). And goals typically offer more benefits than means. As such, when investing resources in both a goal and a means, it might simply be the case that differences in WTP reflect differences in perceived benefits. However, in Studies 3 and 4, we measured nonmonetary resource investment (e.g., allocation of time), rather than preferences for pricing. Moreover, in Studies 1 and 3, we held constant a specific item—and, by extension, held constant its benefits—and manipulated only its status as a goal or a means.

More broadly, in the architecture of goal systems, goals are more primary than means (they are also more important than means, more central than means, and so on). These features of goals are part of the effect we propose (i.e., what causes people to prefer investing in goals) because they are fundamentally part of the architecture of goal systems. However, our studies ruled out the possibility that endogenous differences in these factors (e.g., primacy, importance, centrality) between goals and means explain our effect. For example, exercise and dieting (the stimuli used in Study 4) do not inherently differ with respect to primacy, importance, or centrality. It is only when placed in a goal–means dyad that the architecture of goal systems (which increases the primacy, importance, or centrality of the component perceived to be the goal) systematically changes the preference for resource allocation.

Finally, one interpretation of our results is that means were simply seen as obstacles to goal attainment and thus imposed negative value. For example, one could perceive maintaining a healthy diet to be an obstacle to exercising regularly. Indeed, means are, by definition, externally motivated by goals. If there were a direct way to achieve goals without means, people would not bother with them. However, previous work has demonstrated that means are not uniformly experienced as annoying or negative (Fishbach et al., 2004). Accordingly, when people invest fewer resources in means than in goals, it is not simply because they are viewed as more negative than the goals they serve. Moreover, in our studies, we employed means that involved performing similar activities as the goals they served (e.g., in Studies 5 and 6, cooking

or running as a practice for an actual cooking or running event). In these instances, the experience of pursuing the means was by definition similar to that of pursuing the goal.

Conclusion

In summary, in this research, we offer a theoretical account of how goal systems affect preferences for resource allocation. People prefer to directly invest resources in goals, rather than indirectly invest resources in means to achieve goals. Thus, although the ends may justify the means, the ends may not always justify *investing* in the means.

References

Chandler, J. J., & Paolacci, G. (2017). Lie for a dime: When most prescreening responses are honest but most study participants are impostors. *Social Psychological and Personality Science, 8,* 500–508. http://dx.doi.org/10.1177/1948550617698203

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. http://dx.doi.org/10.3758/BF03193146

Fishbach, A., Shah, J. Y., & Kruglanski, A. W. (2004). Emotional transfer in goal systems. *Journal of Experimental Social Psychology, 40,* 723–738. http://dx.doi.org/10.1016/j.jesp.2004.04.001

Fitzsimons, G. M., & Finkel, E. J. (2010). Interpersonal influences on self-regulation. *Current Directions in Psychological Science, 19,* 101–105. http://dx.doi.org/10.1177/0963721410364499

Fitzsimons, G. M., Finkel, E. J., & vanDellen, M. R. (2015). Transactive goal dynamics. *Psychological Review, 122,* 648–673. http://dx.doi.org/10.1037/a0039654

Hamilton, R. W., & Srivastava, J. (2008). When 2+2 is not the same as 1+3: Variations in price sensitivity across components of partitioned prices. *Journal of Marketing Research, 45,* 450–461. http://dx.doi.org/10.1509/jmkr.45.4.450

Hofmann, W., Finkel, E. J., & Fitzsimons, G. M. (2015). Close relationships and self-regulation: How relationship satisfaction facilitates momentary goal pursuit. *Journal of Personality and Social Psychology, 109,* 434–452. http://dx.doi.org/10.1037/pspi0000020

Kruglanski, A. W. (1996). Goals as knowledge structures. In P. M. Gollwitzer & J. A. Bargh (Eds.), *Linking cognition and motivation to behavior: The psychology of action* (pp. 599–618). New York, NY: Guilford Press.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 331–378). New York, NY: Academic Press.

Laurin, K., Fitzsimons, G. M., Finkel, E. J., Carswell, K. L., vanDellen, M. R., Hofmann, W., . . . Brown, P. C. (2016). Power and the pursuit of a partner's goals. *Journal of Personality and Social Psychology, 110,* 840–868. http://dx.doi.org/10.1037/pspi0000048

McShane, B. B., & Böckenholt, U. (2017). Single-paper meta-analysis: Benefits for study summary, theory testing, and replicability. *Journal of Consumer Research, 43,* 1048–1063.

Orehek, E., Mauro, R., Kruglanski, A. W., & van der Bles, A. M. (2012). Prioritizing association strength versus value: The influence of self-regulatory modes on means evaluation in single goal and multigoal contexts. *Journal of Personality and Social Psychology, 102,* 22–31. http://dx.doi.org/10.1037/a0025881

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42,* 185–227. http://dx.doi.org/10.1080/00273170701341316

Stremersch, S., & Tellis, G. J. (2002). Strategic bundling of products and prices: A new synthesis for marketing. *Journal of Marketing, 66,* 55–72. http://dx.doi.org/10.1509/jmkg.66.1.55.18455

van Osselaer, S. M., & Janiszewski, C. (2012). A goal-based model of product evaluation and choice. *Journal of Consumer Research, 39,* 260–292. http://dx.doi.org/10.1086/662643

Vickrey, W. (1961). Counterspeculation, auctions, and competitive sealed tenders. *The Journal of Finance, 16,* 8–37. http://dx.doi.org/10.1111/j.1540-6261.1961.tb02789.x

Woolley, K., & Fishbach, A. (2015). The experience matters more than you think: People value intrinsic incentives more inside than outside an activity. *Journal of Personality and Social Psychology, 109,* 968–982. http://dx.doi.org/10.1037/pspa0000035

Zhang, Y., Fishbach, A., & Kruglanski, A. W. (2007). The dilution model: How additional goals undermine the perceived instrumentality of a shared path. *Journal of Personality and Social Psychology, 92,* 389–401. http://dx.doi.org/10.1037/0022-3514.92.3.389

Zhou, H., & Fishbach, A. (2016). The pitfall of experimenting on the web: How unattended selective attrition leads to surprising (yet false) research conclusions. *Journal of Personality and Social Psychology, 111,* 493–504. http://dx.doi.org/10.1037/pspa0000056

(*Appendix follows*)

Appendix

Participant Attrition and Study 3 Stimuli

Participant Attrition for Studies 1–6: Across Studies, the Attrition Rate (i.e., Participants Who Dropped the Survey After Being Assigned to Condition) Averaged 4.50%

Condition	Dropouts	Percentage
Study 1 (N = 415)		
Chef's knife	9	2.17%
Cutting board	22	5.30%
Study 2 (N = 83)		
Goal	0	0.00%
Means	0	0.00%
Study 3 (N = 217)		
Goal-means	44	20.28%
Control	48	22.12%
Study 4 (N = 225)		
Goal-means	8	3.56%
Control	8	3.56%
Study 5 (N = 301)		
School	0	0.00%
Marathon	1	0.33%
Dinner	2	0.66%
Study 6 (N = 302)		
School	0	0.00%
Marathon	0	0.00%
Dinner	0	0.00%

Note. Dropouts were not counted toward reported *N*s.

Study 3: Opioid and Heroin Epidemic Article

The Opioid Painkiller and Heroin Epidemic: A Guide to One of the Biggest Public Health Crises Facing America Today

By German Lopez
Vox.com

In 2015, more Americans died of drug overdoses than any other year on record—more than 52,000 deaths in just one year. That's higher than the more than 38,000 who died in car crashes, the more than 36,000 who died from gun violence, and the more than 43,000 who died due to HIV/AIDS during that epidemic's peak in 1995.

This latest drug epidemic, however, is not solely about illegal drugs. It began with a legal drug. Back in the 1990s, doctors were persuaded to treat pain as a serious medical issue. There's a good reason for that: About 100 million US adults suffer from chronic pain, according to a 2011 report from the Institute of Medicine.

Pharmaceutical companies took advantage of this concern. Through a big marketing campaign, they got doctors to prescribe products like OxyContin and Percocet in droves—even though the evidence for opioids treating long-term, chronic pain is very weak (despite their effectiveness for short-term, acute pain), while the evidence that opioids cause harm in the long term is very strong.

Painkillers proliferated, landing in the hands of not just patients but also teens rummaging through their parents' medicine cabinets, other family members and friends of patients, and the black market. As a result, opioid overdose deaths trended up—sometimes involving opioids alone, other times involving drugs like alcohol and benzodiazepines (typically prescribed to relieve anxiety). By 2015, opioid overdose deaths totaled more than 33,000—close to two thirds of all drug overdose deaths.

Seeing the rise in opioid misuse and deaths, officials have cracked down on prescription painkillers. Ideally, doctors should still be able to get painkillers to patients who truly need them (and they can work for some chronic pain patients)—after, for example, evaluating the patient's history of drug addiction. But doctors, who weren't conducting even such basic checks, are now being told to give more thought to prescriptions.

Yet many people who lost access to painkillers are still addicted. So some who could no longer obtain painkillers turned to cheaper, more potent opioids: heroin and fentanyl, a powerful synthetic opioid.

Not all painkiller users went this way, and not all opioid users started with painkillers. But statistics suggest many did: A 2014 study in *JAMA Psychiatry* found 75% of heroin users in treatment started with painkillers, and a 2015 analysis by the Centers for Disease Control and Prevention found that people who are addicted to painkillers are 40 times more likely to be addicted to heroin. So other types of opioid overdoses, excluding painkillers, also rose.

That doesn't mean pulling back on the number of painkiller prescriptions was a mistake. It appeared to slow the rise in painkiller deaths, and likely prevented doctors from prescribing opioids to new generations of people with drug use disorders.

But it must be paired with more access to addiction treatment. According to a 2016 report by the surgeon general, just 10% of Americans with a drug use disorder obtain treatment. The report found that the low rate was largely explained by a shortage of treatment options. So federal and state officials have pushed for more treatment funding, including medication-assisted treatment like methadone and buprenorphine.

Study 3: Life Expectancy Article

What the Fall in U.S. Life Expectancy Is Really About—Inequality: While Poor Americans Are Dying Earlier, the Rich Are Enjoying Unprecedented Longevity

By Julia Belluz
Vox.com

Living in the US increasingly looks like a health risk. Average life expectancy here dropped for the second year in a row, according to recent data from the Centers for Disease Control and Prevention. The grim trend stems from a toxic mixture

(Appendix continues)

of more drug- and alcohol-related deaths and more heart disease and obesity in many parts of the country. And it puts Americans at a higher risk of early death compared with their counterparts in other wealthy countries.

But what's often lost in the conversation about the uptick in mortality here is that this trend isn't affecting all Americans. In fact, there's one group in the US that's actually doing better than ever: the rich. While poor and middle-class Americans are dying earlier these days, the wealthiest among us are enjoying unprecedented longevity.

So when we talk about life expectancy slipping, what we should also talk about is the growing problem of health inequality in America. And it's an increasingly urgent discussion, health researchers are warning, because of policy changes on the horizon that are poised to make the mortality gap even wider.

Some of these policies will hamper access to medical care (such as failing to fund CHIP, the health insurance program for low-income children) but others that aren't even directly related to health care—like tax cuts—may have even more insidious effects on the American mortality gap.

The rich have long-enjoyed more longevity than the poor, but the gap in life expectancy has been widening in the US over the last few decades, along with other types of social and income inequality here.

The CDC's Division of Vital Statistics, which tracks mortality in the US, uses death certificates as the data source, and doesn't collect family income data. But we do have good data on the mortality gap and income from a study published in *JAMA* in 2016.

A group of researchers, led by Stanford University economist Raj Chetty, analyzed income data for the US population from 1.4 billion tax records between 1999 and 2014. They then compared it with mortality data from Social Security Administration death records. They found that, from 2001 to 2014, the richest Americans gained about five years of longevity, while life expectancy for the poor didn't budge.

They also found that men who were among the top 1% of income earners lived 15 years longer than men at the bottom 1%. For women at the extremes of the income distribution, life expectancy differed by 10 years. At Vox, we broke their data down by state, and you can see that wealthier Americans are living longer than poorer Americans all across the country.

This life expectancy divide between rich and poor Americans has been growing for decades. A report from the National Academies of Science looked at life expectancy by income groups between 1980 and 2010. In 1980, the richest cohort of middle-age American men could expect to live until about 83 and the poorest, to 76. By 2010, the richest American males had gained six years in life expectancy, living to 89 on average, while life expectancy for the poorest men hadn't improved.