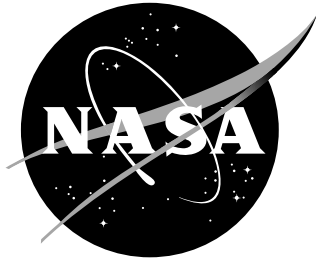# A Quasi-Linear Behavioral Model and an Application to Self-Directed Learning

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February 1999

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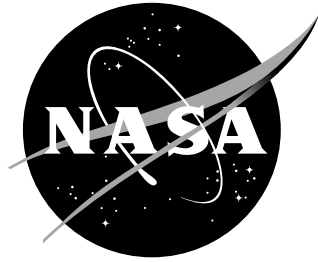
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Summary

A model is presented that describes the relationship between one's knowledge of the world and the concomitant personal behaviors that serve as a mechanism to obtain desired outcomes. Integrated within this model are the differing roles that outcomes serve as motivators and as modifiers to one's worldview. The model is dichotomized between general and contextual applications. Because learner self-directedness (a personal characteristic) involves cognition and affection while self-directed learning (a pedagogic process) encompasses conation, behavior and introspection, the model can be dichotomized again in another direction. Presented also are the roles that cognitive motivation theories play in moving an individual through this behavioral model and the roles of wishes, self-efficacy, opportunity and self-influence.

Introduction

Frese (1997) states that *dynamic self-reliance* is increasing in value as a personal characteristic necessary for success in the jobs of the next century. The critical components of dynamic self-reliance are the ability "to acquire knowledge and skills by oneself (self-training) and to self-start motivational processes (initiative)" (p. 399). Frese asserts that personal initiative is "the centerpiece of self-reliance" (p. 408) and is the behavior in which people "do not wait for orders, suggestions or ideas from other people, but develop their own ideas and start acting themselves" (pp. 408-409). This behavior occurs even at the risk of taking on additional, self-generated tasks. Although Frese opines the importance of self-training and initiative for occupational success, their conjoint relationship is inherent to the activity of self-directed learning.

Learning can be defined as "acquiring knowledge and skills as the result of experience" (Popplestone & McPherson, 1988, p. 212). Hiemstra (1994) asserts a characteristic of self-directed learning is that the individual learner may become empowered with an increasing responsibility for making decisions associated with the learning endeavor. In other words, the learner (i.e., self) is responsible for directing the creation of the experiences that provide knowledge and skills for acquisition (i.e., learning). Covey (1989) states that initiative "mean[s] recognizing our responsibility to make things happen" (p. 75) which, for a self-directed learner, would be the creation of the learning event itself (Ponton & Confessore, 1998). Tough (1982) conservatively estimates that approximately 80 percent of adult learners conduct learning under their own volition thus accenting the importance for studying self-directed learning.

Self-directed learning is also important in the area of leadership. Vaill (1996) defines leadership as the initiative to perform self-directed learning. He asserts that before a leader issues a directive, s/he must take "initiative . . . [in] thinking through (learning) what is needed and why" (p. 134). This autonomous learning instills conviction in the leader as to what is the appropriate course of action. An important responsibility of the leader is to lead the followers through this learning process so that they too will understand the rationale of the decision and subsequently support the action (Vaill). This exercise is critical in the development of future leaders (Ponton & Confessore, 1998).

The definition of self-directed learning can vary subtly or considerably from one researcher to another thereby representing a major concern among scholars in this field (Oddi, 1987). Long (1998) asserts that the research in self-directed learning can be conceptualized under one of four major paradigms: sociological, teaching technique, methodological, and psychological. Long

posits that each paradigm has a requisite set of implications and assumptions. However, he asserts that of these four paradigms, only "the *psychological conceptualization* is both necessary and sufficient to explain SDL [self-directed learning]" (Long, 1998, p. 10). He states:

> The psychological conceptualization implies that fundamentally learning is a self-initiated, self-directed, and self-regulated cognitive process whereby the learner can choose to ignore instruction, to merely absorb it by casual attention, to carefully memorize without critical reflection, or to seek to change or create an understanding of information. (p. 9)

The purpose of this paper is to present a perspective of the pedagogic process of self-directed learning by incorporating the mechanisms of self-initiation, self-directedness, and self-regulation into a quasi-linear behavioral model. The proposed model is quasi-linear in that structurally its components (cognition, affection, conation, etc.) appear to be linearly independent. In fact, great interaction occurs between the components via introspection, movement within the model occurs via self-influence, and inputs to the model can occur via processes external to the model itself. Thus, actual behavior is correctly characterized as a nonlinear process where such a process represents an "intricate system of interacting variables" (Volk, 1995, p. 184). Also characteristic of a nonlinear process (and therefore of behavior as well) is that small perturbations in the initial conditions can cause large and sometimes unpredictable changes in the resultant outcome (Baker & Gollub, 1990; Schroeder, 1991). The quasi-linear behavioral model is presented not as a panacea for the field of behavioral psychology but rather as a tool that may clarify one's perspective of self-directed learning.

Because self-directed learning represents a subset of the behavioral activities that any individual may engage in, presented first is a simple behavioral model in which volitional behavior is predicated on cognition, affection, and conation. Based on this rudimentary understanding, a less simple model will be presented to further explain self-regulatory behavior with an ultimate application to self-directed learning. The influence of self-directed learning to the success of subordinate workers (Frese, 1997) and to leaders (Vaill, 1996) warrants the development of behavioral models that enhances our understanding of this theoretical construct.

A Simple Behavioral Model

Fishbein and Ajzen (1975) provide a general model that indicates the relationship between beliefs, attitudes, behavioral intentions, and behaviors (figure 1). Beliefs provide the knowledge base upon which we know the world. Objects of one's beliefs can be a "person, issue, or event" (Fishbein & Ajzen, 1975, p. 12) or even a behavior. Within the cognition of belief formulation, objects are assigned attributes. Using these attributes, one develops an attitude toward the object. Attitude refers to a consistently favorable or unfavorable response to the given object (Fishbein & Ajzen, 1975) and is an affective process.

For example, one's beliefs may include the following correlations: (a) Corvettes are fast cars, (b) Corvettes are sleek-looking cars, and (c) Corvettes are engineering feats. If one valued fast, sleek-looking, and state-of-the-art-engineered cars, then one would exude a favorable attitude toward Corvettes provided that these were the only attributes under consideration. As Fishbein and Ajzen assert, attitudes feed back into beliefs (figure 1). Based on this presupposed favorable attitude toward Corvettes, one may look for and assign additional attributes that reinforce this favorable attitude. In addition, attitudes toward specific American-made cars may influence beliefs about American-made cars in general. (Note that another individual may feel

unfavorably toward the Corvette because of a lack of value placed on the aforementioned attributes.)

Based on the presumed favorable attitude toward the Corvette, one may then intend to own a Corvette. Intention refers to a determination to engage in an action or to reach a desired future state. A behavioral intention is a determination to perform a particular behavior. Our intention here is ultimate ownership of a Corvette (desired future state). At this point, an acquisition plan must be formulated. For example, should one work extra hours to earn the money needed to purchase a Corvette or should one merely steal one?

As Fishbein and Ajzen (1975) state, these potential behaviors now become the objects of another pass through the model. Note that the arrows in the model indicate movement but are not restrictively unidirectional--self-reflection occurs at each arrow to provide interpretation for self-regulatory volition of movement within the model. The option of stealing is assigned attributes (cognition) and based on one's feelings toward these attributes one develops an attitude (affection) toward stealing. If the attitude is favorable, then behavioral intentions to steal are developed.

Intentions are highly correlated to behaviors if "intention and behavior correspond in their levels of specificity . . . and the degree to which carrying out the intention is completely under the person's volitional control" (Fishbein & Ajzen, 1975, p. 369). A behavioral intention is referred to as a conation where a conation is "an instinctually motivated biological striving that may appear . . . in behavior as action tendencies" (Gove, 1976, p. 468).

Action theory describes the process in which one acts on the environment and the results of these actions provide feedback information that shapes one's worldview.

> The basic premise of action theory is that human beings interpret their own and others' behavior in terms of action-related concepts such as goals, plans, intentions, and beliefs and that their actions are in part determined by those reflexive interpretations. (Chapman & Skinner, 1985, p. 201)

Such introspective interpretations permit an individual's self-regulatory movement within the model. These new beliefs create the foundation upon which the cycle begins again.

Frese and Sabini (1985) state that wishes actually precede intentions. The difference between wishes and intentions is in the level of correlation to behavior. Wishes require opportunity to become intentions. Until an opportunity is perceived to exist, the wish remains dormant but can be easily aroused when an opportunity presents itself. But to what end are we attempting to reach by engaging in the development of beliefs, attitudes, wishes, intentions, and ultimately performing desired behaviors, i.e., where is the motivation?

Bandura (1997) provides insight by presenting the differences between outcomes and performances. Expected outcomes represent the results that one truly hopes will be gained by performing selected behaviors. Actual outcomes are the real outcomes that occur. Outcomes can be physical (e.g., pleasure or pain), social (e.g., acceptance, rejection, promotion, money), or self-evaluative. Self-evaluative outcomes represent a comparison between one's behaviors or the outcomes of one's behaviors and self-standards. Performances are differentiated from outcomes in that they have metrics of accomplishment. For example, an athlete may be motivated to long jump 29 feet (performance goal) in order to gain social acceptance (expected outcome). The athlete is motivated to engage in the behavior because he/she perceives that the correlation between the performance goal and the expected outcome is great. If actual outcomes are different than expected outcomes, then behaviors performed to accomplish the latter may be reevaluated.

Fishbein and Ajzen (1975) state that attitudes can predict general behaviors but not specific ones. Thus, if one has a favorable attitude toward the personal consumption of bourbon (in comparison to other forms of liquor), then one may, in general, drink bourbon when opportunities arise. However, to state emphatically that this person will drink bourbon on a specified occasion based on his/her bourbon attitude is impossible because of the influence of competing factors. This person may be responsible for driving on a particular occasion whereby the unfavorable attitude toward drinking and driving has priority over the favorable attitude toward drinking bourbon.

Behaviors become hierarchical based on the values assigned to them. According to social cognitive theory, human agency is predicted on the triadic reciprocal interaction between personal behavior, internal personal factors and the environment where all three determinants interact with various magnitudes of influence dependent upon the context (Bandura, 1997). The personal factors are one's cognitive, biological, and affective characteristics and the environment represents everything external to the individual.

Thus, one's value system affects the model by not only influencing the attitudes toward the attributes and ultimately the objects in one's belief structure but also toward the actual outcomes of behavioral performances (self-evaluation). But if personal values are so important, where are they in the model? Also, one does not have an attitude toward everything one knows about. There are many objects that a person "knows" via personal experience or vicarious modeling (Bandura, 1965; Bandura, 1977b) and attributes may be assigned to these objects that could have personal meaning. Yet the person maintains neither a favorable nor unfavorable predisposition toward these objects. How does this model account for this situation? If outcomes are so important because they serve as both the motivation and the feedback of behaviors, then where are they in the model?

A Less Simple Behavioral Model

A proposed model is presented in figure 2. This model incorporates the presence of outcomes and wishes and is framed to include general and contextual applications.

General Beliefs, Attitudes, and Desired Outcomes

Everything that one knows is categorized under the general belief rubric. Note that *know* does not necessitate factual information. If one assigns completely erroneous attributes to a given object but that person truly believes that the assignments are valid, then these object-attribute assignments are part of the individual's belief structure. Thus, general beliefs provide the foundation upon which everything else is formed. But one does not enter the world with beliefs (i.e., knowledge of the world). It is through action theory that one learns about the world to formulate beliefs. A newborn acts on the world via behaviors that include observational modeling (Bandura, 1977b) and eventually grows to initiate more dynamic interactions and models of increasingly complex behaviors. Through these influential interactions, a person develops beliefs and *knows* the world.

Based on this general belief structure, one then develops general attitudes. In this context, general attitudes refer to one's value system. Based on his/her worldview, one develops favorable or unfavorable attitudes toward many objects that coalesce under a particular value rubric. For example, the multitude of object-attribute assignments that ultimately produce a high value on the preservation of human life is complex and is certainly unique for every person who possesses this value. The complexity arises because values are the result of specific favorable

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and unfavorable attitudes toward many objects and because these attitudes interact with the belief structure itself. Because beliefs are also affected by behaviors and according to social cognitive theory behaviors are influenced by the person and the environment (as well as influencing the person and environment), the development of the value system must be derived from everything the person knows (i.e., the general beliefs).

After the general attitudes (i.e., value system) are developed, personal determinations are made concerning what one is interested in getting out of life based upon what one has determined to be important. This process results in the formulation of general desired outcomes. These desired outcomes form the outcome goals (as differentiated from performance goals) that motivate the person to determine the contextual activities that may lead to the accomplishment of these outcomes. According to goal theory, the disparity that exists between one's current state and one's desired state provides "a major cognitive mechanism of motivation and self-directedness" (Bandura, 1997, p. 128).

At this stage, however, the motivation is general and is not predictive of contextual behavior, i.e., there is a motivation to engage in some, as yet unspecified, behavior to accomplish desired outcomes. As an example, the desired outcome of being named the chief scientist of a large research organization (social outcome) would serve as a motivating factor in assessing which behaviors are needed to reach this goal. Such behaviors considered may range from personal development to developing political liaisons or some combination thereof. An additional desired outcome of being competent by one's internal standards (self-evaluative outcome) may lead to the ultimate determination to engage in behaviors that are perceived to help accomplish both desired outcomes.

Contextual Beliefs, Attitude, Expected Outcomes and Learner Self-Directedness
At this point, the individual begins to focus on specific objects that will lead to his/her desired outcomes. We now distinguish between two phenomena: learner self-directedness and self-directed learning. Learner self-directedness includes the internal characteristics of a person (cognition and affection) that create the motivation for subsequent behavioral intentions (conations) and behavior. The pedagogic process of self-directed learning includes the behavioral intentions, behaviors and the subsequent self-reflection. Thus, figure 2 is dichotomized accordingly.

After desired outcomes are determined, one will focus on specific processes, such as self-directed learning, that one may feel will produce performance goals that will support the ultimate accomplishment of these desired outcomes. While many behaviors may support the accomplishment of desired outcomes, this paper will focus on the process of self-directed learning. For example, consider the illustration mentioned previously concerning the person who desires to become the chief scientist of a large research organization. As already mentioned, this individual may choose to consider behaviors associated with political positioning rather than self-directed learning activities in order to achieve this desired outcome. This decision is largely predicated on the expectation that particular behaviors will lead to valued outcomes, the premise of the expectancy value theory of cognitive motivation (Howard, 1989).

Although one may develop beliefs and an attitude toward self-directed learning in general (the object of general beliefs), this model incorporates the contextual importance of learner self-directedness that leads to the intentional behavior included in self-directed learning. Thus, the object of the belief is contextual in nature. One may apply completely different attributes and develop different attitudes toward the self-directed learning of particle physics as compared to self-learning how to operate a new blender. But the attributes that we assign to either situation are based on the general framework of our belief structure.

After beliefs have been formulated about the contextual self-directed learning activity (i.e., the contextual object), attitudes are developed. These attitudes may include self-efficacy assessments. Self-efficacy refers "to beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). The major sources of self-efficacy are performance accomplishments, vicarious experiences, verbal persuasions, and emotional arousal (Bandura, 1977a). Therefore, one may apply attributes to the contextual self-directed learning activity that one may feel unfavorably toward due to a lack of perceived ability, or vice-versa. This is the feedback process indicated previously between beliefs and attitudes.

After the attitude is formed, an assessment is made concerning the expected outcomes of the self-directed learning. If one decides to engage in a self-directed learning activity and accomplishes some desired level of competence (performance goal), then will this performance result lead to outcomes (expected outcomes) that supports desired outcomes? Note that this is a cognitive/affective process involving anticipatory considerations. This perceived correlation between performance results and expected outcomes is based on what one believes about the performance thus resulting in a feeling of the magnitude of the correlation. If the magnitude of the correlation is perceived to be high, then the individual creates a wish to engage in the self-directed learning activity.

At this point, an assessment is made concerning the perceived opportunity to engage in the performance. One will not wish to engage in an activity that will hopefully lead to highly valued and highly prioritized outcomes unless one believes that the opportunity is present for such a performance to occur.

Opportunities can be both external and internal in nature. Confessore (1992) asserts that a successful self-directed learning activity is predicated on the presence of the four factors of personal "drive, initiative, resourcefulness, and persistence" (p. 3). These factors are foundational to the personal determination of the existence of a self-directed learning opportunity. If, for example, one does not feel self-efficacious in planning a learning activity where planning is a behavior associated with resourcefulness (Rosenbaum, 1989), then the individual may not perceive that an opportunity exists for this learning activity. Or perhaps the individual does not perceive the availability of requisite learning resources. In either case, opportunity is lacking. Without opportunity, other behaviors that are perceived to produce performances that correlate with expected outcomes may subsequently serve as objects for beliefs and affects or the wish to engage in the self-directed learning may wait dormant until facilitative opportunities arise. The time scale is predicated on the hierarchical value attributed to desired outcomes.

If the opportunity to engage in a self-directed learning activity is perceived to exist, then the wish changes to a behavioral intention. Contingent on the presence of sufficient motivational processes, intention/behavior specificity, and personal volition, behavioral intentions transform into behaviors. Such behaviors produce performances whose actual outcomes are interpreted via reflexive self-evaluation. These actual outcomes influence our perceptions (beliefs and affects) of contextual and general objects of consideration (figure 2).

A summary of the proposed model presented in figure 2 is as follows. An individual develops an understanding of the world (i.e., general beliefs) and based on this understanding creates a value system (i.e., general attitudes). These values lead to general outcomes that are desired from life. Based on these general desired outcomes, the individual evaluates specific behaviors that may lead to expected outcomes that support these desired outcomes (i.e., contextual beliefs, attitudes, and expected outcomes). If the correlation between behavioral performances and expected outcomes is perceived to be high, then a wish is developed to engage in the behavior

(i.e., contextual wish). Based on the presence of opportunity, the contextual wish is transformed into an intention and a subsequent behavior (i.e., contextual intention and behavior). Through self-reflection, the actual outcomes are evaluated and provide input into the model (i.e., general actual outcomes into general beliefs).

Implications to Self-Directed Learning

For self-directed learning to occur, learner self-directedness must be present. This means that the individual must feel that self-directed learning is a viable means to accomplish desired outcomes from life. Thus, self-directed learning becomes the contextual object of beliefs and affects.

The individual learns that self-directed learning is an effective approach initially through vicarious modeling and then gains in self-efficacy with successful learning endeavors referred to as mastery experiences (Bandura, 1997). Because successful self-directed learning is predicated on numerous factors that include, for example, personal initiative and resourcefulness (Confessore, 1992), intervention strategies can be formulated to diagnose and reduce weaknesses in a learner's ability to engage in necessary behaviors that lead to success.

As an example, personal initiative is described as a behavior syndrome of co-occurring behaviors (Frese et al., 1996; Frohman, 1997; Ponton & Confessore, 1998). One of these behaviors is an active-approach to problem solving whereby the self-directed learner assumes the responsibility of developing solution strategies to problems that interfere with the learning activity. A weakness in the ability to perform this behavior could reduce the probability of a successful self-directed learning activity. Therefore, a diagnosis of this weakness may lead to a successful intervention that improves problem-solving abilities thus leading to mastery experiences that increase self-efficacy to perform self-directed learning. With these experiences, self-directed learning becomes a viable option in attaining desired outcomes.

Concluding Remarks

One should note that the proposed model is a quasi-linear perspective of a nonlinear behavioral process. Cognition resulting in self-influence occurs throughout the model, not just in the belief category. Behaviors, personal characteristics and the environment interact reciprocally where changes occur in each determinant from one moment to the next. Behaviors provide input to general and contextual beliefs. Social learning via vicarious modeling also provides input into one's belief structure. The model is by no means all-inclusive but rather a method of framing behaviors with a particular focus on self-directed learning.

A salient goal of structured education is to increase the ability of departing students to successfully engage in self-directed learning activities. Within the framework of this model, self-directed learning must be understood by the individual to be a viable option in attaining desired outcomes from life. For this to occur, the person must not only be self-efficacious but also must have the requisite skills to engage in mastery experiences.

It becomes imperative that the teacher works to develop within each learner the concept that ability is of dynamical proportions and can be increased with diligent efforts. Therefore, even less than successful learning activities are interpreted as processes in which learning ability increases along with enhanced self-efficacy. This perceived as well as actual increase in skills

improves the expectation within the individual that self-directed learning is a viable means to desired ends. Such a realization can ultimately increase the productivity of any organization as well as the personal satisfaction derived from a fulfilling life.

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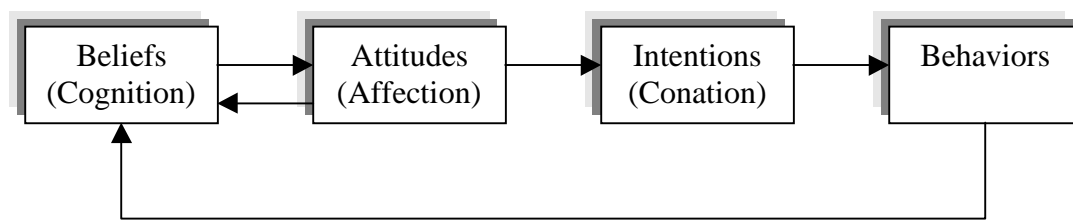
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│   Beliefs    │ ──▶ │  Attitudes   │ ──▶ │  Intentions  │ ──▶ │  Behaviors   │
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Figure 1. A simple behavioral model (Fishbein & Ajzen, 1975).
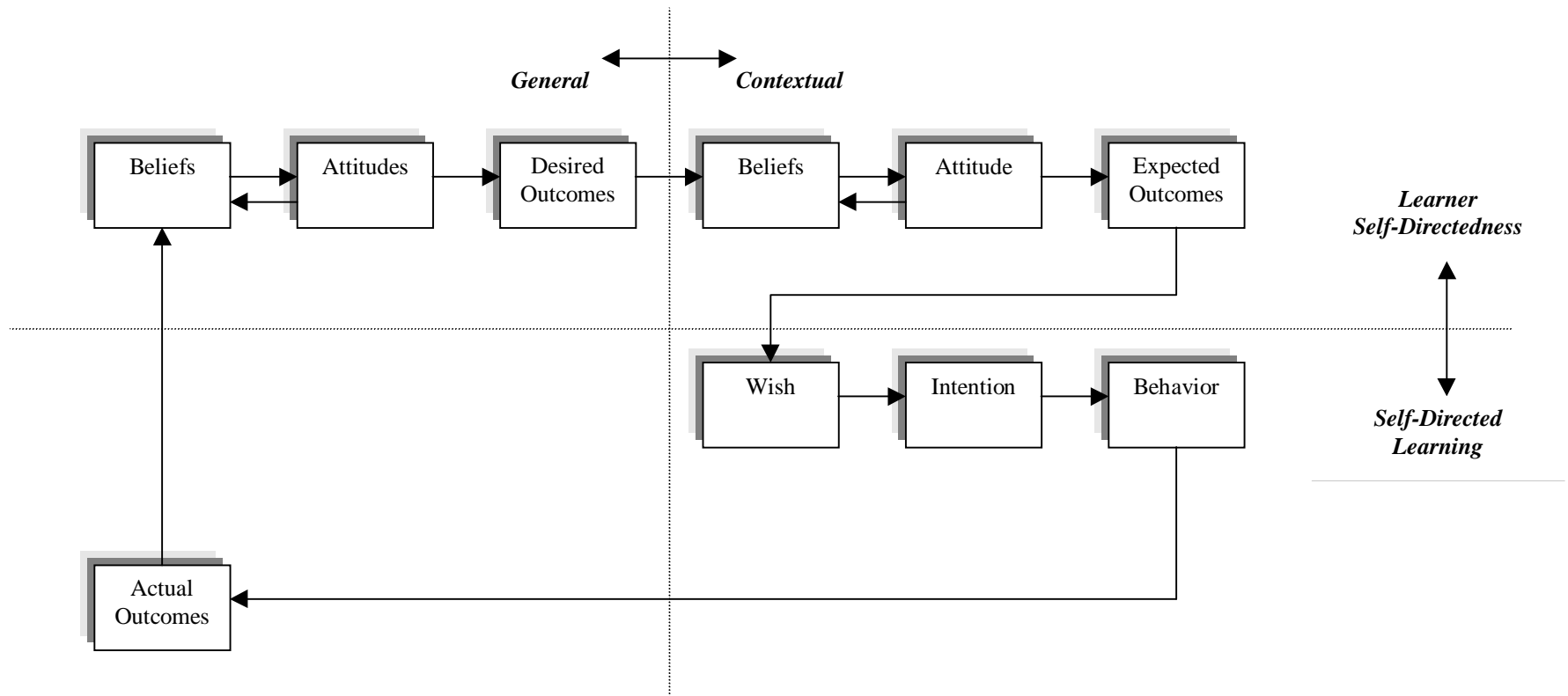
Figure 2. A less simple behavioral model.

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13. ABSTRACT (*Maximum 200 words*)

A model is presented that describes the relationship between one's knowledge of the world and the concomitant personal behaviors that serve as a mechanism to obtain desired outcomes. Integrated within this model are the differing roles that outcomes serve as motivators and as modifiers to one's worldview. The model is dichotomized between general and contextual applications. Because learner self-directedness (a personal characteristic) involves cognition and affection while self-directed learning (a pedagogic process) encompasses conation, behavior and introspection, the model can be dichotomized again in another direction. Presented also are the roles that cognitive motivation theories play in moving an individual through this behavioral model and the roles of wishes, self-efficacy, opportunity and self-influence.

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