THE
DECISION-MAKING ECOLOGY[1]

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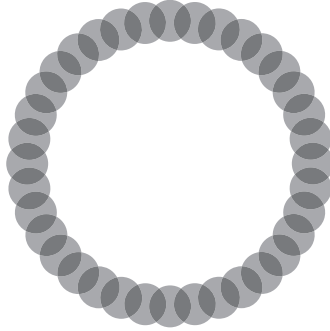Saint Edwards University

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FOREWORD

In 1995, the authors developed the Decision-Making Ecology to help us understand a series of studies we had conducted on decision-making and its consequences. Our findings were published as part of a 12-chapter report we provided to the Children's Bureau (Baumann, Fluke and Kern, 1997). Since that time we have presented the model at numerous conferences and have had many requests for that report. In addition, we have collaborated with others, beginning with the International Society for the Prevention of Child Abuse and Neglect (IPSCAN) meeting in Auckland, New Zealand in 1998 and continuing through the following decade. We then talked with other researchers throughout the United States and globally. This culminated in two decision-making meetings in Denver at the American Humane Association in 2008 and 2010.

This monograph stems from those synergistic exchanges of ideas as our attempt to reach a broader Child Welfare audience by introducing the model into the more formal literature. Our goals are to update what we wrote early on, clarify the concepts in the model, and integrate Dalgleish's (1988; 2003) work on the General Assessment and Decision-Making Model within the Decision-Making Ecology Framework. Dalgleish's contribution to the present framework cannot be overstated: The notion that an assessment needs to be considered as distinct from a threshold for judgment has become central to the Decision-Making Ecology and has helped us understand some of our recent findings. We dedicate this monograph to the memory of our colleague, teacher, and friend, Len Dalgleish.

INTRODUCTION

Over three centuries ago, beginning in the Age of Reason, philosophers championed rational thought. Despite the writings of Freud and others in the late 19th and early 20th centuries, the notion of rational thought and especially rational decision-making remained firmly entrenched in academia through the mid 20th Century. According to two popular theories of the time, Social Exchange Theory (Homans, 1958), and Attribution Theory (Kelly, 1973; Jones and Davis 1966), humans calculated the costs and benefits of various options before making a decision (the former) and weighed personal and situational forces before determining the cause of someone's actions (the latter). Both were formidable models of rational decision-making.

During this same period, the psychological landscape was changing. Simon (1956 & 1959), who later received a Nobel Prize for his efforts, was demonstrating that reason had its limits, proposing a new "Bounded Rationality" model of decision-making. Tversky and Kahneman (1974), the latter of whom also received the Nobel Prize (see Kahneman, 2002), were suggesting that reasoning is even more limited than we had thought. They provided us with ample demonstrations of certain types of errors in decision-making, suggesting that humans applied a number of heuristics - - mental strategies that speed decision-making - - under conditions of uncertainty that often led to error. At this same time, even the unconscious was making a comeback, stripped of its psychoanalytic trappings (Bowers, 1984). By the later part of the 20th century and the early part of the 21st century the idea of the rational decision maker seemed to have given way to a less rational one. Even so, the exchange can hardly be viewed as stable since whether the use of heuristics is as error prone as had been previously thought is now a matter of debate (Gigerenzer, 1991; 1993; 1994; 1996 & 2005; Kahneman and Tversky, 1996) and the debate surrounding rational decision-making will continue to expand into what Kahneman (1991) refers to as "third generation research."

A number of other important theoretical and empirical decision-making frameworks have also been advanced in the sciences. These have included foundational work in the field of judgment and decision-making by Hammond (1955), and Edwards (1954 & 1961). The field has also benefitted from input from many diverse fields such as economics (e.g., Simon, 1959), artificial intelligence (e.g., Weiss, Kulikowski, Amarel and Safir, 1978), psychology (e.g., Tversky and Kahneman; 1974), engineering (e.g., Triantaphyllou and Mann, 1995), medicine (e.g., Hunink, Glasziu, Siegel, Weeks, Pliskin, Elstien, and et. al., 2003), and even meteorology (e.g., Monahan and Steadman, 1996). These contributions can provide insight and understanding about decisions made by Child Welfare protective services. Yet, the Child Welfare field has struggled to benefit from the knowledge gains and progress regarding decision-making research. Instead, it has focused on correcting errors through building risk and safety instruments rather than understanding the source of the errors.

Two Child Welfare models in the literature are noteworthy, however. The first is an early decision-making model by Stein and Rzepnicki (1983). This model outlined the systematic goals of Child Welfare (e.g., safety and family preservation), pointing out some key processes that included decision-making along with important domains of information (e.g., family, agency, courts, law, etc.). The model broadly sketched the landscape but got little traction empirically. The second, a systems approach by Munro (2005), regards human error as the starting point for understanding decision-making. It takes into account individual factors such as skills and knowledge, resources and constraints such as analytic vs. intuitive judgment, along with the organizational context in which decisions are made such as changes in thresholds.

The Munro model is compatible with the one we present here. As indicated, the Decision-Making Ecology was first described in the mid 1990's (Baumann, et. al., 1997). Like Munro's model, it also takes human error as the starting point for understanding decision-making and suggests that decisions need to be understood within their context. In the discussion that follows we first present the Decision-Making Ecology Framework along with a description of the Decision-Making Continuum and a presentation of the General Assessment and Decision-Making Model (GADM) that explains the psychological process of decision-making. We then conclude with illustrative applications of the concepts.
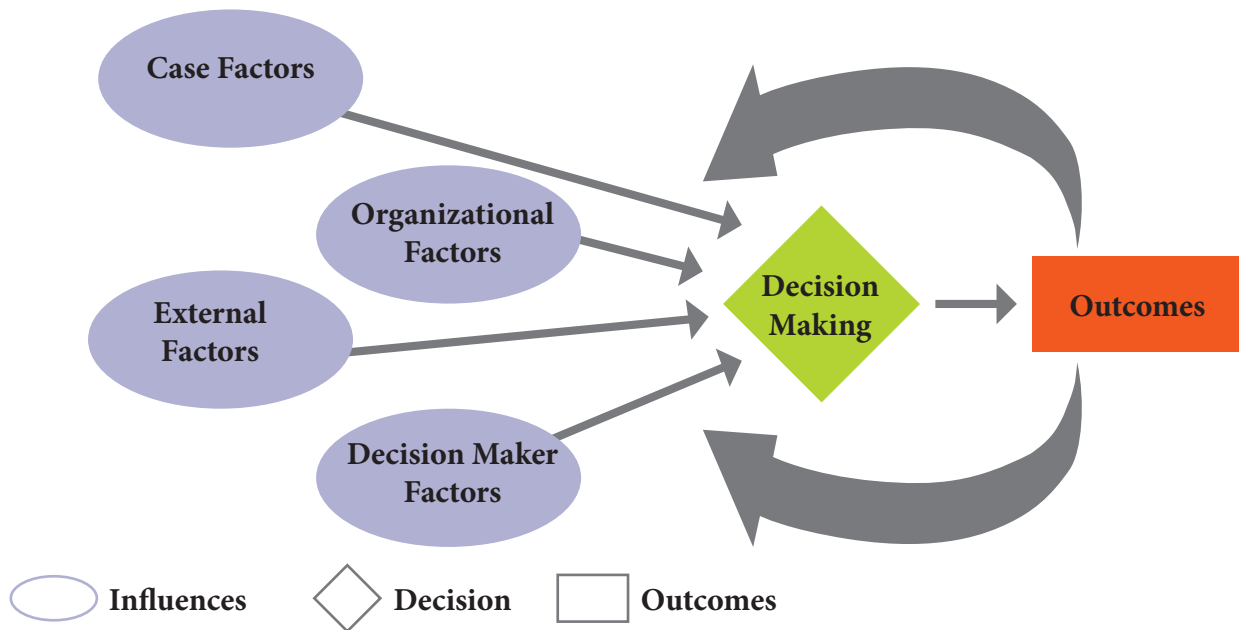
Decision-Making Ecology Framework

The Decision-Making Ecology framework presented here represents an effort to advance the field of Child Welfare decision-making using the knowledge gained from the decision-making sciences. It is a framework for organizing decision-making research in Child Welfare and places the topic squarely in the context of actual protective-service operations in this field. This is done because decisions take place within an agency culture where a systemic context combines with the case decisions made by the management and staff of the agency. This model drawn initially from thinking based on child protection screening research (Wells, Fluke, Brown, 1995) has been successfully applied to the problem of disproportionality (Baumann, Fluke, Graham, Wittenstrom, Hedderson, Riveau, et. al., 2010; Fluke, Chabot, Fallon, MacLaurin, Blackstock, 2010; Rivaux, James, Wittenstrom, Baumann, Sheets, Henry, et. al., 2008.) the substantiation decision (Fluke, Parry, Shapiro, Hollinshead, Bollenbacher, Baumann, and et. al., 2001), the decision to place children into care (Graham, Fluke, Baumann, and Dettlaff, in preparation; Fluke, et. al., 2010), burnout and turnover (Baumann, Kern, McFadden, and Law, 1997) and the decision to reunify children with their families (Wittenstrom, Fluke, and Baumann, in preparation).

As shown in Figure 1, the systemic context for decision-making includes a set of influences displayed as ovals. These cover the range of case, external, organizational, and individual factors that combine in various ways to influence decisions and outcomes. These influences can be divided into dimensions that represent their important features, and decisions can be understood as a part of this entire context.

For example, case information regarding an incident of maltreatment is necessary for a caseworker to make informed assessments and decisions, yet some of the assessments and decisions depend on external factors, such as law translated into policies that govern what constitutes an appropriate response. Furthermore, the translation of such standards by organizational management, and their use by staff, will vary as a function of individual decision maker factors which include knowledge and skill, as well as the actual and perceived costs and benefits (outcomes) of the decision to the decision maker, the client and/or the agency.

Figure 1

Decision-Making Ecology

Consider first some evidence on case factors. In two studies (Rivaux, et. al., 2008; Dettlaff, Rivaux, Baumann, Fluke and Rycraft, in preparation) researchers were able to show that both the substantiation decision and placement decision were affected by ethnicity, risk, and poverty in predictable ways. Findings that concern individual factors (Baumann, et. al., 2010) indicated that disparate placement decisions can be ameliorated by caseworkers having higher case skills, especially those involving cultural awareness. Consider, too, organizational factors. Having a higher proportion of African Americans or Hispanics on one's caseload (exposure) also ameliorates disparate placement decisions for African Americans or Hispanics, respectively. Finally, consider external factors. Fluke and his colleagues, using the Canadian incidence data, provide support for the possibility that the lack of community resources was one of the sources of placement disparities among Aboriginal Children (Fluke, et. al., 2010). These findings illustrate that sources of decision-making errors can be empirically understood and their remediation made possible within the Decision-Making Ecology.

The diamond in Figure 1 represents caseworker decision-making. The three features of decision-making in Child Welfare are: 1) the range of decisions made by the caseworker, referred to as a Decision-Making Continuum, 2) the psychological process of decision-making, and 3) the consequences of the decision. The key feature of the Decision-Making Continuum shown in Figure 2 is that it runs through the episodes, or stages of service, involved in cases processed by Child Welfare. In fact, one way to think about the job of a caseworker is as the coordinator of a Decision-Making Continuum.

This continuum starts at intake ("Do I initiate an investigation or not?") and ends at case closure when all children in a family are deemed to be safe from maltreatment in the foreseeable future. It is not uncommon for a very large number of minor decisions to be made leading to each of the major or key decisions.

The relative size of the cylinders in Figure 2 can be viewed as representing case volume and the length of the cylinders' duration. The episodes are shown at the top of the continuum and cover caseworker decisions that range from intake (1) through service provision (2) and removal (3) for the first incident and consequently labelled as 4, 5 and 6 for the second incident.

Figure 2
Flow of Clients through the Decision Making Continuum
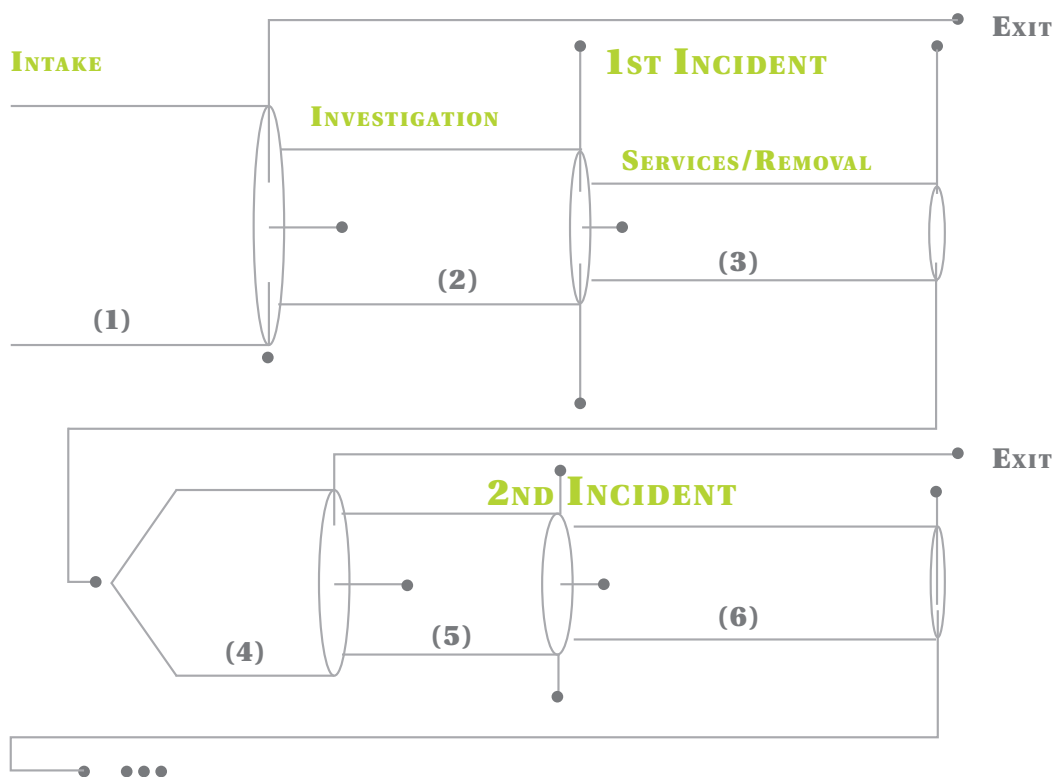
The Psychological Process of Decision-Making: The General Assessment and Decision-Making Model (GADM)

The psychological process of decision-making has three important features. First, it is useful to make a distinction between a judgment and a decision. As shown in Figure 3, a judgment is an assessment of a situation given the current case information.

This judgment may be about the amount of risk or the strength of evidence or overall level of concern. Each of these can be an estimate along a dimension ranging from low to high. A decision addresses whether or not to take a course of action. So the General Assessment and Decision-Making (GADM) model's alternative title could be "A General Model for Assessing Situations and Deciding What to Do about Them." In this model, we assume a threshold for action that turns an assessment of a situation into a decision-about action.

Thus, a second important feature of the psychological process of decision-making is a decision threshold. A decision threshold refers to the point at which the assessment of the case information (e.g., amount and weight of evidence) is intense enough for one to decide to take action. This decision threshold is a personal "line in the sand." It is influenced by the experiences and history of the decision maker. These are both their actual or vicarious experiences and their interpretation of external factors and organizational factors in the Decision-Making Ecology. In fact their own internal factors might be at odds with these external or organizational factors. The theoretical base for the threshold concept is Signal Detection Theory (Swets, Tanner, and Birdsall, 1955) and, more recently, Dalgleish (1988 & 2003), who proposed the GADM model in the child-welfare field that makes the important distinction between assessment and action.

A third component in the process of decision-making is a shift in this threshold. A shift in threshold refers to a change in the amount of evidence deemed to be sufficient; a threshold shift would be involved if various features of the Decision-Making Ecology changed the basis for the decisions that fall along the decision-making continuum. One organizational influence that would alter the decision would be a policy that dictates which cases would be accepted or should be attended to immediately (e.g., age and injury requirements for cases accepted and prioritized). An individual factor influencing a threshold shift might be experience. For example, a new worker might tend to render more affirmative decisions to be on the "safe side." Conversely, an experienced worker may know of — and be wary of — the consequences for children placed in the fostering and adoption system. Factors such as these would change the thresholds of the individuals and also impact the volume of cases moving through the Decision-Making Continuum.

Figure 3

A General Modle for Assessing the Situation and Deciding what to do about it – *Dalgleish*

Assessment Dimension:

e.g. Risk or 'Level of Concern'
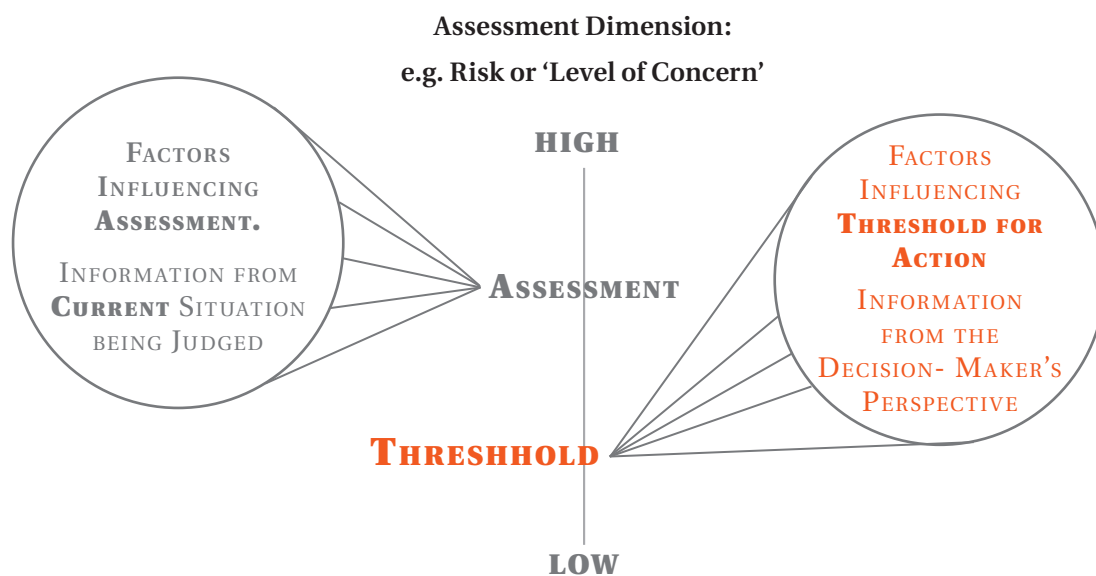
If the **Assessment** is *ABOVE* the **Threshold**, the ACTION is taken.

If the **Assessment** is *BELOW* the **Threshold**, then NO ACTION is taken.

APPLICATIONS: THE DME AND THRESHOLDS ALONG THE CONTINUUM

The model can be applied at each of the key decision points of the Decision-Making Continuum: At Intake (Dalgleish, 2003), at Removal (Dalgleish, 1988), and at Reunification (Dalgleish and Newton, 1996). Consider the intake and the removal decisions. The threshold for each requires adequate information to make an assessment. The threshold may be higher for removal, compared to that required at intake, and this is reflected in the size of the cylinders in Figure 2 which indicate that as one moves further along the continuum there are fewer children in the system. Furthermore, at the right end of the Decision-Making Continuum one might not only expect a higher level of information needed to make an assessment, but different types of information as well. For example, an intake worker may primarily consider information about the allegation, whereas an investigator making a removal decision may additionally consider the amenability of the situation to intervention, given the nature of the risk. For reunification, Dalgleish and Newton (1996), found that information about the sustainability of change in the family was a factor influencing the assessment of risk. Thus, different case information needed to make an assessment at different stages along the Decision-Making Continuum is a major factor and it is possible that the assessment and the threshold for a decision can be the same, particularly at the extreme ends of the risk continuum. However, other influences in the Decision-Making Ecology can alter the decisions along the Decision-Making Continuum. For example, lowered appropriations or the passage of legislation limiting the length of time a child may remain in foster care (external factors) might cause the agency to alter its policy (an organizational factor) on the permanency planning for children in care. This would result in a threshold shift for reunification, even under the same assessment conditions that might have existed prior to the policy change.

APPLICATIONS: THE DME AND OUTCOMES

A final feature of the Decision-Making Ecology is the outcome of these decisions. Outcomes are represented by the rectangle in Figure 1. The large reversed arrows in Figure 1 indicate the assumption that, to the degree that the consequences of decisions can be presumed, perceived, or known, thresholds may shift through the four influences of the Decision-Making Ecology: case, organizational, external and individual decision maker factors.

In the Decision-Making Ecology, outcomes are viewed from three perspectives having to do with consequences to the client, the decision maker and those external to the agency. All affect the factors in the Decision-Making Ecology, and thus the decision thresholds. The more familiar perspective involves outcomes to the client. Safety, permanency, and well being are the best examples. However, another more immediate consequence is to the decision maker. In decision theory this is typically considered the more immediate utility of a decision. First, it can affect changes in decision thresholds. Consider, for example, how a decision to close a case that results in a child fatality would affect a decision maker's threshold. Second, these consequential decisions (among other factors in the DME) can affect whether or not a worker stays with the agency (Baumann, Kern, McFadden and Law, 1997). Finally those consequential outcomes that are external to the agency can include public anxiety, media scrutiny and legislative scrutiny. Child fatalities often generate all three. These outcomes are all related in the sense that they can operate simultaneously. For example, a serious recurrence of maltreatment impacts the child and the family, and the caseworker who may have closed the case. Both the family and caseworker could be held accountable in one sense or the other and all would experience the event itself in a negative way. The scrutiny by those external to the agency would bring additional pressure to bear and would impact the accountability of the agency as well. This might well involve legislative and or policy changes (external or organizational factors) that would change thresholds for taking action. Even in the absence of actual events, the decision maker's perception that such outcomes could occur undoubtedly influences thresholds.

The decisions that lead to these consequential outcomes are fraught with uncertainty because the decision maker cannot avoid the possibility of error. If action is taken, the decision maker might be wrong and if action *is not* taken they might be wrong as well. Hammond (1996), calls it the "duality of error." Table 2 below reflects these errors. It shows the four possible outcomes for the decision to remove the children from their home and place them in care: Two types of correct outcomes and two incorrect ones. The box in the upper left-hand corner shows a correct decision to remove the child from the home. The box in the lower right corner shows a correct decision to not remove the child from the home. The box in the upper right-hand corner shows that errors resulting in false positives can result in an unwarranted placement in care because the child was safe. The box in the lower left-hand corner indicates that a lack of action can result in harm to the child. One or the other of these errors is unavoidable. Moreover, the consequences of these errors may be considered as symmetrically bad and they sometimes are (McMahon, 1998).

That is, a false positive error where the child is mistakenly placed in care may be considered as dreadful as a false negative error where the child is not placed and re-harmed. However, they are often asymmetrical depending on who is affected by the error. An unwanted placement may be only annoying compared to a child who is seriously re-harmed. Further, agencies place greater emphasis on one source of error over another, moving away from one kind of error over another and willing to indulge the opposite kind of error (Mansell, 2006).

Table 2. Outcomes for decisions to take action or not: The four-fold table.		
Decision: **YES** Remove	**Hit** Correct outcome	**False Alarm** Error Damned if you Do False Positive
Decision: **NO** Not Remove	**Miss** Error Damned if you Don't False Negative	**Correct No** Correct outcome

## APPLICATIONS: TRAINING IN THRESHOLD PLACEMENT AND THRESHOLD DIFFERENCES

Different caseworkers will value these consequences differently. To demonstrate this and roughly identify threshold placement, a decision maker could answer this question: "Given that you can't avoid the possibility of error, which one do you want to avoid the most?" At one level the decision is nearly as simple as that. However, it might be difficult for the decision maker to articulate why he or she prefers to avoid one error over another. The number of stakeholders on the decision helps explain this dilemma. In child protection they include: The child, the family, the caseworker themselves, their work unit, their supervisor, their agency, other professionals, the courts, and society in general. For each of these stakeholders, and for each outcome, there are sets of consequences. Which raises the question: "Do the various people working in child protection differ in the values they place on consequences?" The answer is "yes."

A memorable example came to one of the authors (Dalgleish) during a workshop on thresholds for people working in multidisciplinary child-protection teams. After going through the process of making the consequences explicit for different stakeholders, a family physician said that he wanted to avoid "false alarms" (false positives) because of the harm to families falsely accused of child abuse. This was vehemently challenged by a social worker from a public children's hospital who wanted to avoid "misses" (false negatives) because she had seen many dead and injured children.

In terms of the GADM model, the physician's threshold was high and he may require a higher level of risk and thus greater concern before he took action. The social worker's threshold was low and thus lower levels of risk can generate high levels of concern requiring her to take action. To make things equal in this example, let us assume that they are both told about a case and given the same case information. Assume also that they have been well trained in an assessment tool and have jointly assessed the case to have moderate levels of risk.

Figure 4 indicates why the physician would not want to take action and the social worker would. They don't differ in their assessment of the case but they do differ in their decision to take action or not. In the GADM model this is called "decisional conflict." Alternatively, but though less commonly, (Rossi, Schuerman, and Budde, 1999), two people might have the same threshold for action but differ in their assessment of the case factors and the integration of the case-factor information into a summary assessment-like risk. The GADM model refers to this as "judgmental conflict." Judgmental conflict is easier to resolve since it requires both people to review the case factors and agree on what ones to include in their assessment, as well as the relative importance of the case factors. Decisional conflict is much more difficult to resolve since it depends on the relative value decision makers place on the consequences of the possible outcomes as discussed above.

Figure 4: Applications of the Threshold Concept
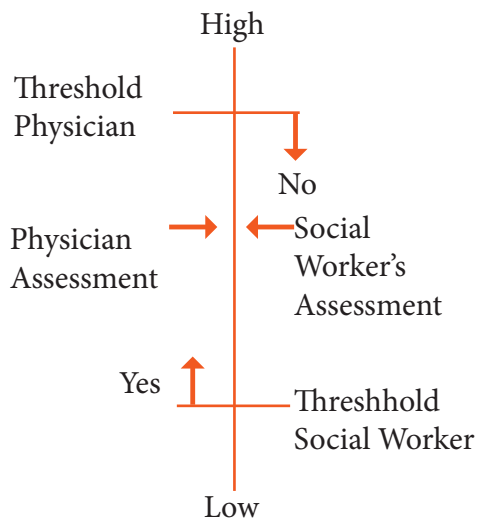
- If threshold low, needs little evidence before taking action.
- If threshold high, needs much evidence before taking action.
- Even if they agree on the assessment.
- They disagree about taking action.

Summary and Conclusions

In this brief monograph, we have attempted to present a case for the usefulness of the Decision-Making Ecology combined with the General Assessment and Decision Model. We began by making the point that the field of Child Welfare has been slow to take advantage of decision-making frameworks — a dilemma that has impeded our efforts at understanding errors in decision-making and their context. This concern is important because if we fail to learn from the errors we make, we limit the options for how to address these errors in the future.

We then presented what we have learned thus far using this framework. For example, we have learned that the DME can be applied to a number of contexts, including the substantiation, removal, and reunification decisions — all of which are key decision-making points along the Decision-Making Continuum. It is also applicable to the context of social problems such as disproportionality since disparate decisions at key decision points can increase overall disproportionality. Indeed, key factors in the DME, such as case, individual, organizational, and external factors, are found to increase or decrease disparities and allow us to better understand it.

The DME also contains the General Assessment and Decision-Making (GADM) Model which helps to explain the psychological process of decision-making more fully. In that regard, three psychological processes were described. The first was the distinction between the psychological process of assessment and that of deciding to take a course of action. The point being that, although the assessment (e.g., of case factors) might be the same, individuals may differ in the action they decide to take. This second process is known as a decision threshold — a factor that we again note varies among individuals based upon their various experiences with factors in the DME. The final important psychological process is that this threshold can shift. Mansell (2006) provides a good example of such a shift. He describes threshold changes in the New Zealand Child Welfare system as a function of the degree to which family preservation or child protection is emphasized by policy makers over time, which can be related to outcome concerns over child safety in dynamic balance with the costs of services.

We also applied the Decision-Making Ecology in this monograph to three situations as further demonstrations of its usefulness. In the first, we used the decisions along the Decision-Making Continuum as an example of decision makers having different thresholds for different decisions. The intake decision was used as an example of a low threshold, relative to the removal decision where higher thresholds for taking action are more likely. A related application

that helps explain this difference is the outcomes, or consequences, to the client, the decision maker and those external to the agency. In this application we introduced two types of errors that decision makers try to avoid; false positives and negatives. Here we noted that depending on the value of avoiding either type of error, thresholds may differ. We also noted that agencies place different values on avoiding different types of errors and accepting others. Our final application pertained to training. There we discussed an exercise in which different outcomes carried different consequences for participants and showed that one error was more likely to be avoided over another, depending on the consequences to the decision maker.

All of this has strong implications for policy and practice. From a policy perspective, knowing the source and magnitude of errors and what factors in the DME may mitigate these errors allows clearer and more precise policy to be written, and resources to be better targeted. If, for example, it is known that the amount and mixture of cases on a worker's caseload affects his or her decisions, explicitly designed experiences with different caseload mixes can be structured as part of on-the-job-training. Importantly, exposure to African American clients (Baumann, et. al., 2010) mitigates these decisions implying that such exposure should be a part of training.

Practice might also be affected more directly by training programs that target specific errors and how they are mitigated. For example, one source of error uncovered by Dettlaff and his colleagues (Dettlaff, et. al., in preparation) and by Rivaux and her colleagues (Rivaux, et. al., 2008), is the fundamental attribution error. This error appears to lie behind disparate decisions to substantiate and to place children in care. It seems that workers may attribute poverty to the person, rather than to the situation and are thus more likely to have a lower threshold for decision-making for African Americans than Anglos. More explicit and experiential training with regard to poverty and risk may be beneficial in improving self-awareness concerning the fundamental attribution error.

In conclusion, in the decade or so since we began working from within the Decision-Making Ecology framework we have seen it bear fruit as we have indicated herein. We, along with the colleagues we have worked with over this period of time, would urge the field of Child Welfare to devote more effort to empirically understand the context of decisions that are made, the psychological process of decision-making, and the sources of errors that are made. The outcome should be a major improvement in decision-making in Child Welfare.

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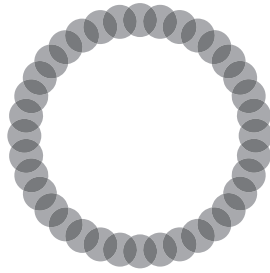
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