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**Pilots' Decisions to Continue Visual Flight
Rules (VFR) Flight into Adverse Weather:
Effects of Distance Traveled
and Flight Experience**

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Abstract

Visual Flight Rules (VFR) flight into Instrument Meteorological Conditions (IMC) is a major safety hazard within general aviation. In this study, pilots' decisions to continue or divert from a VFR flight into IMC during a dynamic simulation of a cross-country flight were examined. Pilots encountered IFR conditions either early or later into the flight and the amount of time and distance pilots flew into the adverse weather prior to diverting was recorded. Results revealed that pilots who encountered the deteriorating weather earlier in the flight flew longer into the weather prior to diverting, and had more optimistic estimates of weather conditions, than pilots who encountered the deteriorating weather later in the flight. Both the time and distance traveled into the weather prior to diverting were negatively correlated with pilots' previous flight experience. These findings suggest that VFR flight into IMC may be due, at least in part, to poor situation assessment and experience rather than to motivational judgment that induces risk-taking behavior as more time and effort is invested in a flight. Interventions should therefore focus on improving weather evaluation skills in addition to addressing risk-taking attitudes.

INTRODUCTION

In an analysis of General Aviation (GA) accidents between 1990 and 1997, Goh and Wiegmann (2001) found that the fatality rate of accidents involving visual flight rules (VFR) flight into instrument meteorological conditions (IMC), or unqualified flight into adverse weather, was consistently higher than that of other GA accidents. The fatality rate of VFR into IMC accidents was approximately 80% during this period compared to approximately 19% for other types of GA accidents. These statistics reflect similar trends found by the National Transportation Safety Board (1989) for U.S. GA accidents that occurred during the 1970s and mid-1980s, as well as GA accident trends in other countries (e.g., United Kingdom and New Zealand). Together, these findings clearly indicate that VFR flight into IMC is a major safety hazard within General Aviation (O'Hare & Smitheram, 1995).

Visual flight rules flight into IMC is often characterized by pilots' decisions to continue a flight into adverse weather conditions, despite having been given information or presented with cues that indicate they should do otherwise (National Transportation Safety Board, 1989). This continuation of one's original plan even with the availability of new evidence suggesting that the plan should be abandoned, has been termed a Plan Continuation Event (PCE) (Orasanu, Martin & Davison, in press). In circumstances when the identified events are considered errors, PCE also stands for Plan Continuation Errors.

Plan Continuation Errors (PCEs)

Burian, Orasanu, and Hitt (2000) analyzed 276 aviation incident reports that involved weather events and found that 28% of the 333 identified decision events were considered to be Plan Continuation Errors. The commission of PCEs in these cases was very strongly related to violations of the rules as defined by Reason (1990). In other words, the continuation of a flight into adverse weather was often found to be a willful disregard for the regulations and cues that dictated an alternative and safer course of action. According to the authors, these violations reflected a growing commitment to a chosen course of action, or tendency to adhere to an original plan, which ultimately interfered with pilots' critical analysis and ability to evaluate the feasibility of the chosen plan over time.

A similar explanation for VFR flight into IMC focuses on predictions made by Prospect Theory (Kahneman & Tversky, 1982). For example, O'Hare and his colleagues (O'Hare & Owen, 1999; O'Hare & Smitheram, 1995) have investigated how pilots frame the situation of continuing or discontinuing a flight into adverse weather. In essence, their hypothesis predicts that pilots who frame diverting from the planned flight as a loss (e.g., loss of time, money and effort), will tend to continue with the flight while those who frame the diversion as a gain (e.g., personal safety) will tend to divert. Indeed, O'Hare and Smitheram (1995) found that, during a simulated VFR cross-country flight, pilots who were presented with adverse weather information that focused on the gains of diverting were less likely to continue with the flight than pilots who were presented the same weather information that focused on the losses associated with diverting.

O'Hare and Smitheram (1995) have suggested that in a real world flight environment, decision frames may be induced by the proximity of the pilots' goals, such as the destination

airport. As goal achievement gets closer, there may be a natural shift from the gains to the loss frame, resulting in what is known within Prospect Theory as the “sunk cost” effect. Specifically, if more has been invested in a certain course of action, the less likely this course of action will be abandoned than if less were invested (Kahneman & Tversky, 1982). O’Hare and Owen (1999) formally tested this hypothesis by requiring pilots to fly a simulated cross country flight in which they encountered adverse weather either early or late into the flight. The prediction was that pilots who encountered the weather late into the flight (long condition) would more likely continue because of the greater investment of time than those who encountered the weather earlier during the flight (short condition). However, the results of the study failed to support the sunk-cost hypothesis in that the majority of pilots in both the short and long conditions chose to divert the flight.

O’Hare and Owen’s (1999) have suggested that the lack of support for the sunk-cost effect in their experiment could have been due to several methodological issues rather than necessarily the invalidity of the hypothesis. In particular, the primary measure of pilots’ decision-making processes was their decision to either continue or divert the flight by the time they had reached a particular point in the flight. The pilots in their study were then considered to have chosen to either continue or divert the flight. However, this dichotomous classification of the pilots’ decisions may not have been sensitive enough to detect differences in the way pilots viewed the situation and their subsequent decision. Rather, a better measure might have been to assess the amount of time or distance that the pilots had flown into the weather prior to diverting, allowing a greater variability in pilots’ responses. Indeed, most VFR pilots will likely decide to divert from adverse weather; however, some decide too late and ultimately crash. Thus, the amount of time that pilots take to choose to divert a VFR flight into IMC might better capture the natural processes by which these decisions are made in real world situations.

Situation Assessment Errors

In contrast to the PCE or sunk cost hypothesis, Goh and Wiegmann (in press) have suggested that VFR flight into IMC might better be explained in terms of errors in situation assessment. According to the situation assessment hypothesis, pilots risk pressing on into deteriorating weather because they do not fully realize they are doing so. In other words, pilots continue VFR flight into IMC when they misdiagnose the changes in, or severity of, the weather. Presumably, had they known that the weather was deteriorating into IMC, they would not have flown into it. For example, in an empirical investigation of this issue, Goh and Wiegmann (in press) found that pilots who chose to continue with a simulated cross-country flight into the adverse weather conditions had less accurate assessments of visibility than those who chose to divert. In addition, Goh and Wiegmann’s (2001) analysis of accident records from the NTSB accident database showed that between 1990 and 1997 a quarter of the VFR into IMC accidents clearly involved inadvertent encounters with adverse weather. Therefore, at least in some cases, VFR flight into IMC might better be viewed as a failure of recognition-primed decision-making (RPD; Klein, 1993) rather than a willful disregard of the rules and regulations.

The loss of situation awareness that precipitates a “VFR into IMC” event, however, may be due to a variety of reasons, the most important of which is likely to be the lack of experience interpreting real-time weather by low-time or “fair weather” pilots. The importance of experience in problem diagnosis is central to Klein’s (1993) Recognition Primed Decision

Making model (RPD). According to the RPD model, experience or expertise allows an individual to quickly diagnosis a situation, thereby immediately identifying a feasible course of action. Experience, therefore, allows the individual to overcome the effects of time pressure since there is little need to compare the feasibility of different action alternatives. Indeed, Burian et al. (2000) found that pilots in their study who were in the 25th percentile and below in terms of total flight hours were more likely to commit PCEs than those in the 75th percentile and above. The authors take these findings to suggest that some pilots, particularly those with less experience, “do not trust what their eyes are telling them and so proceed on blindly”. In addition, Goh and Wiegmann (2001) found that pilots involved in VFR into IMC accidents had fewer total flight hours and lower airman certifications than pilots involved in other types of accidents.

The situation assessment hypothesis suggests that pilots’ experiences are a key factor in predicting VFR flight into IMC. Specifically, pilots with more experience should be better able to properly diagnose adverse weather and therefore decide to divert sooner than pilots with less experience. Furthermore, the situation assessment hypothesis might reasonably predict the opposite effect of weather location than does the sunk-cost hypothesis. Since pilots generally receive a weather briefing prior to departure, encountering unexpected adverse weather early in a flight would directly contradict their mental model of the current weather system. Therefore, pilots may be more prone to “go take a look” to update their situation assessment, given their confusion about the weather and the fact that the departure airport provides a safe haven immediately behind them (McCoy & Mikunas, 2000). In contrast, on long flights, initial weather information knowingly becomes relatively old and unreliable, yet pilots have the opportunity to update their mental model of the weather using their senses and flight instruments. Perhaps, with an experientially based model of the situation and no immediate safe haven behind them, pilots may be more reluctant to press on into adverse weather and therefore decide to divert more quickly.

Purpose of the Present Study

The purpose of the present study was to further examine these issues by studying pilots’ decisions to continue or divert from a visual flight rules flight (VFR) into instrument meteorological conditions (IMC) during a dynamic simulation of a cross-country flight. During the flight, general aviation pilots encountered IFR conditions either early or later into the flight and the amount of time and distance pilots flew into the adverse weather prior to diverting was recorded. According to the sunk-cost hypothesis, pilots who encounter the adverse weather later during the flight should continue flying into the weather longer than those who encounter the weather early during the flight, given more time and effort has been invested in the flight. However, the sunk-cost hypothesis makes no predictions about the relationship between pilots’ prior flight experiences and their flight into the adverse weather. In contrast, the situation assessment hypothesis suggests that, when adverse weather is encountered early in a flight, pilots may be more prone to “go take a look” or fly longer into the adverse weather in an attempt to reconcile the disparity between the encountered weather and the weather information recently obtained prior to departure (McCoy & Mikunas, 2000). In addition, the situation assessment hypothesis also predicts that pilots with more experience should be better able to diagnosis the adverse weather, and should therefore decide to divert the flight sooner than those with less experience.

METHOD

Participants

Thirty-six private pilots (35 male, 1 female) from Central Illinois participated in this study. Participants were recruited in a manner to ensure a broad range of flight experience. Their total flight hours ranged from 63 to 1983 hours (Mdn=236.1 hrs) and they had completed between 4 and 550 (Mdn=45) cross-country flights at the time of the study. Twenty-five were instrument-rated. Participants' ages ranged from 18 to 62 years (Mdn=43.5 yrs). All were compensated \$20 for their participation, which did not exceed 2 hours.

Materials and Procedure

At the onset of the study, participants signed a consent form and then completed a pre-experimental questionnaire. This questionnaire required participants to provide demographic and background information including age, sex, total flight hours (dual and solo), total VFR hours, total IFR hours (simulated and actual), total hours of cross-country flight, total number of cross-country flights (dual and solo), and total number of hours flown in the last 30 and 90 days. Upon completion of this questionnaire, participants read a set of instructions that described the simulated flight scenario. The instructions explained that participants were going to make two VFR cross-country flights, the first of which was a practice flight from Champaign (CMI) to Terre Haute (HUF) in order to familiarize themselves with the simulator. In the second experimental flight, they were to fly from Champaign to Rochelle (12C), which was approximately 120 nautical miles. Participants were told to imagine making this solo cross-country flight for the purpose of logging flight time.

Participants were introduced to the Frasca 142 flight simulator that was configured as a Cessna 172. The simulator had a full set of instruments as well as a radio stack. All the necessary controls (yoke, rudder peddles, throttle) were also available. An Evans and Sutherland SPX 2400 visual system was used to project a 135° view of the outside visual world. This system was capable of displaying real time weather changes and three-dimensional fixes along the flight route. After the practice flight (approximately 20 minutes), the participants were provided with a checklist, map and flight plan which detailed the route and the fixes along the route. They were provided with Terminal Aerodrome Forecasts, METARS, and Winds Aloft information for the day of the flight. Participants were told that the weather observations were taken at 7:30 am that day and were good till 7:30 am the next day. The weather conditions at take-off were above VFR minimums (5 miles visibility, 5000ft msl cloud ceiling). Winds were forecasted to be from the northwest (310) at 8 knots with a 20% chance of rain later that evening. Participants were given as much time as they needed to review the weather information and other flight planning details.

Participants were instructed to treat the flight like any that they would make in the real world. They were told to be aware of any possible failure, either mechanical or otherwise, that might occur during the flight. They were also informed that failures might not necessarily occur. In the event that they decided to divert from the planned flight, they could choose any alternate airport that was on the map, including returning to the departure airport. They were instructed to inform the experimenter if and when they decided to deviate from the original flight plan and to

press a pre-determined key on the simulator to mark the point in the flight at which this decision was made.

Prior to the experimental flight, pilots were assigned to one of the two experimental conditions, controlling for total flight time, flight time in the last 30 and 90 days, and instrument rating. For participants in the short-group ($n = 18$), weather conditions degrade to IMC, reaching 2 miles visibility and 1500 ft msl cloud ceiling approximately 30 nm into the flight (approximately 15 minutes from the departure airport). For participants in the long-group ($n = 18$) weather conditions decreased to 2 mi visibility and 1500 ft msl cloud ceiling approximately 90nm into the flight, which was roughly 30 nm or 15 minutes from the destination airport. For both groups, the deterioration of weather conditions (lowering of cloud ceiling and reduction in visibility) occurred gradually, beginning roughly 15 miles from the point at which they would be at their worst. It should be noted that pilots could not transition to an IFR flight plan into the destination airport, because the airport did not have the facilities capable of supporting an instrument approach. Participants were allowed to continue the flight until they either decided to divert the flight to an alternate airport or until they crashed the airplane. Both the amount of time and distance that pilots flew into the deteriorating weather was recorded.

Following the flight simulation, participants completed a post-experimental questionnaire to examine the participants' assessment of the weather conditions, in terms of visibility and cloud ceiling, at the time the program was terminated. Next, pilots were compensated, thanked for their participation, and then dismissed.

RESULTS

Effects of Weather Location

Time and distance flown into deteriorating weather. For analysis purposes, the point along the pilots' flight path at which the simulated cloud ceiling dropped to 4000 ft msl and visibility degraded to 4 nm was designated the location at which pilots had encountered degrading weather. The time and distance that pilots in both the short- and long-groups traveled beyond this point were collected. Of note, all of the 36 pilots in this study continued flight past the point at which the weather began to degrade. Of these, 35 pilots ultimately diverted. One pilot in the short-condition lost control of the airplane while continuing flight into the adverse weather and "crashed".

The overall distance and time that pilots flew into the adverse weather conditions varied considerably. In general, the distance pilots traveled into the weather ranged from .91 nm to 13.32 nm ($Mdn=4.74$ nm) and the time traveled into the weather ranged .45 minutes to 5.8 minutes ($Mdn=2.49$ minutes). However, Mann Whitney tests revealed that pilots in the short-condition traveled significantly further ($Mdn=5.94$ nm vs. $Mdn=3.65$ nm, $U=76$, $p < .01$) and longer into the deteriorating weather ($Mdn = 2.86$ minutes vs. $Mdn=1.48$ minutes, $U=91$, $p < .05$) than those in the long condition. (These differences remained even when the data from the pilot in the short group who crashed was excluded from the analysis.) As a result, the severity of the weather that pilots in short condition ultimately encountered was generally worse. In particular, the cloud ceiling eventually encountered was significantly lower for pilots in the short condition ($Mdn=2614.5$ ft msl) than for those in the long condition ($Mdn=3359$ ft msl), $U=75.5$, $p < .01$.

This was also true for visibility (short: $\underline{\text{Mdn}}=2.96$ nm vs. long: $\underline{\text{Mdn}}=3.59$ nm, $\underline{\text{U}}=75.5$, $p < .01$).

Situation assessment. The accuracy of pilots' SA was computed by subtracting actual weather parameter (i.e., visibility and cloud ceiling) from pilots' estimates at the time they had chosen to divert the flight, or in the case of the one pilot who crashed, at the time of the accident. Based on these assessments, pilots were considered to be under-estimators (UE), accurate-estimators (AE), or over-estimators (OE) for both the visibility and cloud ceiling variables. For the visibility variable, participants were considered UE if their estimates were more than 1 mile below actual visibility conditions, AE if their estimates were within plus or minus 1 mile of actual conditions, or OE if their estimates were greater than 1 mile above actual visibility conditions. For the cloud ceiling variable, participants were considered UE if their estimates were more than 200 ft below actual cloud ceilings, AE if their estimates were within plus or minus 200 ft of actual ceilings, or OE if their estimates were greater than 200 ft above actual cloud ceilings.

Overall, approximately one third of the pilots accurately estimated visibility and cloud ceiling (35.3% for visibility and 33.3% for cloud ceiling). A relatively equal proportion of pilots either overestimated visibility (26.5%) and cloud ceilings (25%) or underestimated visibility (38.2%) and cloud conditions (41.7%). A Chi-square analysis revealed that the weather-location manipulation had little effect on pilots' estimates of visibility. A relatively equal proportion of pilots in both the short and long flight conditions either accurately estimated (38.9% vs. 31.3%) or underestimated (44.4% vs. 31.3%) visibility. However, weather location did appear to have a significant effect on estimates of cloud ceilings, $\chi^2(\underline{\text{N}} = 36, 2)=8.511$, $p < .05$. Specifically, a significantly larger proportion of pilots in the long condition (50%) accurately estimated cloud ceiling than those in the short condition (16.7%). Furthermore, a larger portion of pilots in the short flight condition were likely to overestimate the height of cloud ceilings (44.4%) than pilots in the long condition (5.6%), whereas a relatively equal portion of pilots in both the long (44.4%) and short-conditions (38.9%) underestimated cloud ceilings.

The Role of Flight Experience

Time and distance flown into deteriorating weather. Table 1 presents Spearman rank-order correlations between flight experience variables (total flight hours, total solo hours, actual IFR hours, total VFR cross country hours, and hours in the last 30 and 90 days) and the distance and time pilots traveled into the deteriorating weather. As can be seen from the table, all flight experience variables were negatively correlated with both time and distance flown into the weather, indicating that the less experience or flight hours that pilots had the farther and longer they tended to travel into the weather. The experience variables with the largest negative correlations were those that involved recent flight experience (i.e., hours logged in the previous 30 and 90 days).

Table 1. Spearman rank order correlations between flight experience variables and the amount of time and distance pilots continued flying into the deteriorating weather.

	Total Hrs	Solo Hours	Actual IFR	Total VFR X-Country	30 days hrs	90 days hrs
Combined						
Distance	-.181	-.226	-.287	-.167	-.372*	-.384*
Time	-.147	-.195	-.260	-.120	-.450**	-.462**
Short Grp.						
Distance	-.170	-.292	-.185	-.020	-.367	-.292
Time	-.205	-.300	-.330	-.065	-.387	-.317
Long Grp.						
Distance	-.333	-.404	-.311	-.510*	-.658**	-.603**
Time	-.224	-.289	-.155	-.338	-.740**	-.675**

* $p < .05$, ** $p < .01$

These correlations, however, differed across experimental groups. In the short condition, no significant relationships were observed between any of the flight experience variables and the amount of time and distance pilots had flown into the weather, albeit the direction of the relationships were still negative. In contrast, the negative correlations between recent flight experience during previous 30 and 90 days were stronger and highly significant for pilots in the long condition. Furthermore, a significant negative correlation was also observed between total VFR cross-country flight hours and the distance that pilots in the long condition flew into the adverse weather during the experiment.

Experience and situation assessment. Analyses were performed to assess possible differences on the flight experience variables across different levels of SA accuracy. In general, participants who underestimated visibility and cloud ceilings (i.e., were more conservative in their estimates) tended to have more overall flight hours compared to those who accurately estimated or overestimated these parameters. However, median test indicated that these differences were not significant and did not vary consistently across short- and long-experimental conditions.

DISCUSSION

The results of the present experiment suggest that the location at which adverse weather is encountered during a flight does affect pilots' decisions to continue with the flight. Specifically, pilots who encountered the deteriorating weather conditions earlier in the flight flew longer into the weather prior to diverting than pilots who encountered the deteriorating weather conditions later in the flight. This finding contradicts the sunk-cost hypothesis that pilots will be more likely to continue VFR flight into IMC as more time and effort has been invested in the flight. In addition, this finding also challenges conventional wisdom within the aviation field

that VFR flight into IMC is simply due to motivational judgment processes such as “get-thereitis” (Jensen, 1995).

The results of the present study are more in line with the situation assessment hypothesis (Goh & Wiegmann, 2001; Goh & Wiegmann, in press). Possibly, pilots who encountered adverse weather early in a flight were more prone to “go take a look” or fly longer into the adverse weather in an attempt to reconcile the disparity between the encountered weather and the weather information recently obtained prior to departure. This explanation is supported by the finding that pilots who encountered the adverse weather early in the flight were more likely to overestimate (believe the clouds were higher than they were) than pilots who encountered the weather later in the flight. Presumably, pilots in this latter group knew that the weather information presented to them prior to departure had become old and possibly unreliable. They were therefore more likely to trust their senses when interpreting the weather than were pilots who encountered the weather early during the flight.

Another possibility, however, is that the observed differences in situation assessments between pilots in the short- and long-conditions were due to more implicit perceptual processes (i.e., adaptation levels and change detection) than to explicit cognitive processes or mental model reconciliation (i.e., go-take-a-look). Specifically, for the short group, cloud ceiling and visibility conditions started to change almost immediately after departure whereas for the long group, the same weather changes began after a long “baseline” of steady weather conditions. Perhaps it was easier for pilots to notice the change in the weather after they had been exposed to a long period of stable weather, which then suddenly changed, than it was for pilots in the short group who experienced relatively continuous changes in weather following departure. Indeed, there is evidence from psychophysical research that “sudden” changes from “normal” are generally easier to detect than similar changes within a continually changing visual array (Dember & Warm, 1979). Additional research is needed, however, to determine whether the rate in which adverse weather conditions change actually does affect pilots’ situation assessments.

Pilots’ previous flight experiences influenced how long they continued flight into the adverse weather prior to diverting. In particular, the more experienced pilots tended to divert sooner than the less experienced pilots. This relationship was generally stronger when the adverse weather was encountered later in the flight, possibly because the changes in the weather in the short condition did occur relatively quickly. The relationship between experience and weather-related decision making has also been observed previously. For example, in simulated scenarios involving flight into adverse weather, Wiggins and O’Hare (1995) found that pilots with more cross-country flight experience were more likely to continue with a flight than those with less experience. However, in the present study, the number of flight hours in the previous 30 and 90 days were found to be the most relevant experience variables, suggesting that recency of experience may be as important as total experience in some cases.

The exact role that experience plays in affecting pilots’ decisions about whether to continue or divert VFR flight into IMC is still unclear. One obvious role is that experience improves pilots’ abilities to evaluate changing weather conditions. Indeed, according to the SA hypothesis, pilots with more experience should be better able to diagnosis adverse weather and should therefore decide to divert the flight sooner than those with less experience. However, in the present study, no discernable relationship was found between pilots’ flight experience and

their estimates of visibility and cloud ceilings. One possibility for the lack of any observable relationship may be that verbal and written reports of weather conditions are simply not sensitive enough to discriminate between differences that exist across experience levels. Furthermore, differences in pilots' abilities to estimate weather conditions across experience levels may be limited to the extreme ends of the distributions. For example, Burian et al. (2000) needed to compare pilots in the 25th percentile and below in terms of flight hours to those in the 75th percentile and above in order to find differences in the likelihood of committing PCEs. Clearly more research is needed to explore the role that different experience factors play in pilots' aeronautical decision-making processes.

Finally, as with all laboratory and simulator studies, the external validity of the experiment and the generalizability of the findings need to be addressed. Indeed, one issue of concern is that of pilots' perceptions of risk. Obviously, the risks involved in flying a simulator are relatively nonexistent and therefore cannot be compared to actual flight into adverse weather. Consequently, there is always the possibility that pilots may not take the simulated flight seriously and thus exhibit risk-taking behaviors that would not normally occur in the aircraft. In the present study, efforts were made to encourage pilots to treat the simulation as they would an actual flight and results revealed that pilots did not exhibit a proclivity for "pressing on" into the deteriorating weather, suggesting that they were considering the "risks" of VFR flight into IMC. On the other hand, pilots may be exhibited more cautious behavior than they normally would in the airplane because they were trying to impress the experimenter with their good judgment. In either case, enough variability in pilots' behavior was observed to detect significant difference across experience levels and treatment conditions. Whether such differences are actually larger or smaller in the real world is unclear.

A second important issue related to external validity is that of the match between the simulated flight scenario and real world flying conditions. In the present study, some pilots encountered changes in weather very soon after departing from the airport. The extent to which pilots would ever actually encounter such conditions, however, is difficult to determine. The primary sources of such information are obviously naturalistic databases that come from accident and incident reports. Unfortunately, such data sources are often incomplete and have only scanty data pertaining to the actual weather locations and conditions associated with these events. Nonetheless, there are examples in which pilots have, either knowingly or unwittingly, taken off into adverse weather conditions (Wiegmann & Goh, 2001). However, no single scenario can match all of the weather conditions that pilots may encounter during flight. Additional research is therefore needed to explore the impact that different scenarios have on pilots' decision-making processes.

CONCLUSION

Visual Flight Rules (VFR) flight into Instrument Meteorological Conditions (IMC) is a major safety hazard within general aviation. The purpose of the present study was to empirically examine how the location of the weather along the flight path affects pilots' decisions to either continue or divert a flight into adverse weather. The findings suggest that, under these conditions, VFR flight into IMC may be due in part to poor situation assessment and experience rather than to motivational factors and risk-taking behavior that increase with time and effort invested in the flight. Interventions should therefore focus on improving weather evaluation

skills in addition to addressing risk-taking attitudes. One example would be the “Weatherwise” computer-based training program recently developed for the FAA by Wiggins and O’Hare (under review) that uses static images and short video clips to help pilots practice identifying critical weather cues. Initial evaluations of this program have shown positive effects on aeronautical decision making. Clearly, such effective interventions can only be developed through empirical research and a deeper understanding of naturalistic decision-making processes.

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