Third-Culture Kid Pilots and Multi-Cultural Identity Effects on Pilots' Attitudes

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Third-Culture Kid Pilots: Effects of multicultural identities on pilots' attitudes and behavior

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Suggested running head "Third Culture Kids as Pilots"

Abstract

Background:

Current attempts to culturally tailor human factors training in aviation segregates cultural identities based on geopolitical, passport nationality, and is therefore poorly suited for (adult) 'Third Culture Kids' (TCKs) whose cross-cultural upbringing has led to the development of multi-cultural individual identities that do not reflect their passport nationalities.

Method

A survey with items imported from established scales was distributed to pilots of an international airline to measure pilots' work values, flight management attitudes, and cultural dimensions, with respondents segregated into Western, TCK, or Asian cultural groups.

Results

Of the three cultural groups, TCK pilots had the strongest belief in crew communications. TCKs shared similar work values with Westerners, were similarly individualistic, had comparable preference for shallow command gradients, were similarly pragmatic in self-evaluation of performance under stress, and both had lower dependency and preference for rules and procedures. TCKs scored in the middle between Westerners and Asians in automation preference attitudes, and on the cultural dimensions of power distance and uncertainty avoidance. TCKs did not share any similarities with Asians at all.

Discussion

The results show that TCKs were neither assimilated into a mainstream culture, nor culturally "middle of the pack" as may be expected from their "East meets West" backgrounds. Having identified TCK pilots' unique values, attitudes, and dimensions, practical implications include changing training design to better suit TCKs' cultural characteristics and the adaptation of airline management to cater for TCKs' work values.

Key words: Diversity, International School, Hofstede's Dimensions, Flight Management Attitudes Questionnaire, CRM

Manuscript

Background

Culture instils in people systems of interconnected and unwritten rules which govern how they function both individually and collaboratively. Existing literature has demonstrated that there is a relationship between pilots' national culture, their work values and flight management attitudes[5], with significant differences observed between Western and Asian cultures[2,6]. These studies, however, typically utilize geopolitical, passport nationality to segregate pilots into different cultural groups, and are therefore insufficiently representative of the growing population of globally nomadic, multi-cultural pilots whose passport nationalities may not be truly representative of their personal cultural identities, values, and attitudes. For example, in a survey of Hong Kong nationals, 13% of respondents did not identify culturally as Hong Kongers[7, pp.8]. Cultural categorization by nationality may therefore misrepresent these multi-cultural individuals' attitudes on the flight deck.

Third Culture Kids

A common reason for the mismatch between individuals' own cultural identity and their passport nationality is from spending significant parts of their developmental years outside their parents' "home" culture. Known as *Third Culture Kids* (TCKs), these individuals build relationships to and assimilates elements from both their "home" and "host" cultures, but never develop full ownership of any one culture. They consequentially form an interstitial "third" culture with a sense of belonging in relation to other people of similar background[12]. A "third culture" identity is most commonly observed in the children of immigrants or those who have accompanied parents on overseas postings. Even when individuals have never

physically migrated internationally, a TCK identity can still be developed from having parents of different cultures, or by attendance in international schools (with different language and curriculum to "host" country national schools) which would create a daily transition between the home (domestic) and school (international) cultures[12].

Despite obvious differences between the refugee-immigrant child and the privileged international school student, TCKs from all of the above backgrounds can in fact be considered as a singular *cultural nation*[12]. The culture of a 'nation' is defined by its identity, values, and institutions[9]. TCKs of all backgrounds share a common *identity* of rootlessness, transience, and socially being "a part of and apart from" their peers[4, pp. 322]. Implicit *values* such as mobility, intercultural sensibility, adaptability, and acceptance of cultural diversity are also shared amongst all TCKs[4,12]. *Institutions* shared by TCKs include, for example, international schools, expatriate/immigrant communities, and the sub-communities of the sponsoring corporation or aid agency[12].

Specifically, the TCK identity is restricted to only include individuals who have experienced cultural migration *during their childhood years*, to the exclusion of expatriates or migrants whose cultural relocation happens in later, adult life. This is because it is during adolescence when a person's sensibilities to rules and conceptions, interpersonal relations, and moral and religious ideals are formed[14], and these are the dimensions which affect aircraft pilots' attitudes. In contrast, layers of culture that are acquired in adult life tend to be more changeable as they are generally more superficial and less embedded in an individuals' personality[9].

Existing literature in the education arena shows that TCKs are more likely to display Western-leaning dispositions. The preference for an English language

education based on an internationally recognized syllabus means that the children of families who regularly relocate internationally will more likely attend international schools that are based on Western values and syllabi[3]. For the same reason, it is also more likely for an ethnically Asian TCK to attend an English-medium, Western curriculum school (thereby picking-up Western values), than it is for an ethnically Western TCK to go to an Asian-language school whilst growing up in Asia[14]. It is therefore a matter of simple probability that TCKs of all ethnic/passport origins are more likely to pick up Western values and attitudes through exposure to a Western education. In the aviation environment, these Western leaning traits will likely translate to attitudes such as more self-reliance[2], lower rule orientation[6], and lower preference for automation[13].

TCKs are also likely to be better communicators than their mono-cultural counterparts. As TCKs possess an expanded worldview and a higher level of intercultural sensitivity as a result of their multicultural background, they are inherently more dependent on communications to avoid cross-cultural misunderstandings[14]. This is supported by TCKs' greater propensity to speak up and to voice a different opinion owing to their greater experience in communicating (and often translating) between diverse groups[12]. As communications between crew members is considered "a key element of CRM"[2, pp. 112], TCKs' greater communication abilities may be beneficial in the cockpit.

Further, as TCKs do not have a "mother culture" to adopt as a consequence of their multi-cultural upbringing, they will necessarily develop moral values individualistically directed to and only to one's individual interpretation and

judgement[12]. It is probable that these more individualistic, self-driven attitudes may be detrimental to crew coordination and cohesiveness in multi-crew environments[2]. The question, therefore, is whether these behavioral differences between TCKs and people of singular cultural backgrounds are observable in the aviation environment.

Cultural Influences on the Flight Deck

Previous research on cultural issues in aviation human factors, where participants were grouped by *geopolitical nationality*, identified antipodal attitudes between Western and Asian pilots which are best replicated by socio-psychologist Geert Hofstede's cultural dimensions of *individualism-collectivism* (IDV), *power distance* (PD), and *uncertainty avoidance* (UA)[9,10]. The IDV and PD dimensions affect crew interaction, group harmony, and the willingness of subordinates to speak up to the Captain with critical information, whilst UA addresses pilots' propensity to follow orders and standard operating procedures[6,10]. Engle[2] observed that IDV and PD are usually inverse, with cultures belonging into either one of two distinct groups of *high* or *low context*. In the *high context* group are Asians, with low IDV, high PD, and high UA; whereas the *low* context group is represented by Westerners with high IDV, low PD, and low UA.

Comparing Asian and Western cultures, previous studies have shown that high context Asian pilots had a greater preference for communications, liked to share responsibilities, and were better at building group cohesiveness, but they would almost universally avoid questioning the actions or decisions of superiors (representing low IDV and high PD)[2]. They were also found to be more rule oriented (representing high UA)[6], with individual events understood in consideration of a wide host of factors[11]. Contrarily, low context, Western pilots were much more self-reliant,

communicating only on an as-needed basis[2]. Westerners were also less concerned with rules and procedures (low UA), corresponding to a lower degree of adherence to regulations and standard operating procedures on the flight deck[6]. They also applied more straightforward rules when considering the behavior of objects[11]. These observations are in agreement with Helmreich & Merritt's[5] study of pilots' work values and flight management attitudes which found that whilst Asian pilots favored greater adherence to rules and procedures, had higher levels of automation reliance and preference, and were comparatively more inclined towards autocratic command styles, Western pilots were the opposite. Pilots of Western cultural backgrounds favored greater independence from the organization and displayed slightly more realistic attitudes to stress management[5]. They also had a lower preference for automation which was likely to be reflective of their higher IDV, as individualistic pilots saw automation as robbing them of flight control autonomy[13]. These values and attitudes, however, have never been defined for the TCK cultural nation. Whilst some previous studies have found TCKs to be Western-leaning and hence low context[3,14], other studies suggest that TCKs may in fact be more like the high context group on certain metrices. For example, TCKs have been found to be more dependent on communications[12], which would be more reflective of high context attitudes.

An understanding of pilots' attitudes on these dimensions has direct consequences. For crew resource management (CRM) training, these simple-tounderstand representations of cultures provide an ideal platform on which pilots joining multi-cultural airlines can be provided with an awareness of the multi-cultural environment and guidance on how to navigate it[1]. Knowledge of which cultural dimensions are more strongly rooted and resistant to change can also influence

training design so that the focus can be placed on dimensions that are more easily amenable to improve training efficiency[13]. Understanding team members' cultural dimensions can also enhance group dynamics. For example, in a study evaluating leadership roles in Chinese space flight it was found that when the subjects are from a collectivistic (low IDV) culture, a supportive leadership style is more desirable for group interactions in comparison to controlling, directive leadership strategies[15].

Existing studies of the effects of cross-culture on the flight deck generally focuses on enhancing cross-cultural interaction between pilots of different cultures working together on culturally mixed flight decks[1,6]. With international migration becoming increasingly common, there is a need to investigate the impacts of cultural mixing "within the individual". The values and attitudes of TCK pilots, whose cultural identities do not conform to that of any geopolitical national group, need to be determined.

This study considers TCKs as a distinct cultural nation. It is a nation defined by shared identity and values, and not by geography or political passport nationality. TCK pilots' work values and flight management attitudes were assessed using questions drawn from the established Flight Management Attitudes Questionnaire (FMAQ)[5]. The cultural dimensions of TCK pilots were also assessed using Hofstede's Values Survey Module (VSM)[8] to further determine if *TCK pilots'* values and behaviors on the flight deck correlate with socio-psychological measures of cultural dimensions.

Method

Design

Data collection was by a 59-item survey with items imported from existing FMAQ and VSM questionnaires. Items from the FMAQ (1996 version)[5] provided a measure of the respondents' work values and flight management attitudes, whilst VSM-based items (2013 version)[8] measured the pilots' cultural dimensions. The use of questions from these methodologies ensured that the results are based on recognized, established scales, and allows direct comparison with previous research using established geographic conceptualizations of culture.

Work values were addressed over 12 FMAQ derived questions representing preferences for *relations* (importance of good relationships with superiors and coworkers), *rewards* (high earnings and advancement), *independence* (life away from work, sense of accomplishment), and *order* (strict time limits, job with no surprises, the one solution)[5]. As the focus was on finding cultural influences on *desired* work values, pilots participating in the survey were asked to imagine their ideal job, as opposed to rating their current job, when completing these questions.

Flight management attitudes were assessed through composite scales of *command, communications, stress, rules & order, and automation*, also derived from the FMAQ[5]. A high score on the *command* scale reflects a preference for autocratic command styles, with greater power distance between the Captain and crew, less communications initiated by junior crew, and greater unquestioned reliance on the Captain for the conduct of flight. The *communications* scale represents belief in interpersonal communications. Pilots' attitudes toward stress were assessed in two subscales: the *my stress* subscale, which addressed the pilots' self-evaluation of

their own performance under stress; and the *others' stress* subscale with items related to the management of both their own stress when working as part of a team and also in relation to their teammates' stress levels. The *rules & order* scale concerns pilots' dependency and preference for set rules and procedures. Finally, the *automation* scale reflects the pilots' preference for and their reliance on automation.

Items based on the VSM[8] assessed the pilots' values and behaviors on Hofstede's cultural dimensions of IDV, PD, and UA, all of which have been proven to replicate in the aviation environment[5,6,10].

Participants and Sampling

Supplementary items were added to the survey which enabled the categorization of respondents into cultural groups. Western and Asian groups consisted of individuals who were born, bred, and had both parents from within their respective cultural backgrounds. TCKs, on the other hand, were defined following Pollock & van Reken's definition as "individuals who have spent a significant period of time away from their parents' culture during childhood"[12, pp.21]. The length of time spent away from the parents' culture was not explicitly defined in the survey, as it was considered that time by itself is not a determinant factor of third culture development and therefore it was left for the respondent to decide what was "significant". Childhood was defined as up to age 18[12, pp.21]. Also included in the TCK group were those who had attended an international school, and individuals who had parents of different cultures (may or may not be of the same race). In summary, respondents who identified with either one of the following groups were categorized into the TCK cultural nation:

- Western parents but who spent a significant period of time in Asia during childhood (up to age 18)

- Asian parents but who spent a significant period of time in the West during childhood (up to age 18)

- Born to parents from at least two cultures. May or may not be of the same race.

- Have studied in an international school

The survey was distributed via internal memo to a multicultural population of pilots employed by a large, international airline based in Hong Kong (51 passport nationalities). Participation was voluntary and confidential, with no identifying information collected. Constraining participants to pilots employed by the same airline created a more homogenous sample as variables from influences in training, organizational culture, and professional culture were minimized. Keeping all variables except cultural background constant provided a higher degree of confidence that the resulting differences were solely due to variations in national culture.

Results

Statistical Analysis

One-hundred and six responses were received, comprising 47 (44%) from Westerners, 38 (36%) from TCKs, and 21 (20%) from Asians. The subsample sizes were sufficient for the comparison of "culturally influenced values and sentiments of similar respondents from two or more countries" as they exceeded Hofstede & Minkov's suggested minimum sample size of 20 participants per homogenous nation for ensuring that outlying answers by single respondents would not unduly affect the

overall results[8, pp.2]. The TCK sample consisted of a diverse group of ethnically Western TCKs (n=13), ethnically Asian TCKs (n=18), and TCKs with parents from different cultures (n=7). A higher percentage of the Western pilots surveyed (94%) previously flew for another airline before flying at the current airline, in comparison with TCKs (47%) and Asians (14%).

Outliers which exceeded 2.5 standard deviations from the item mean (p<0.9875) were removed, and the items' polarity were checked to ensure that higher scores represented a greater desire for work values items, an inclination for autocratic command, stronger belief in crew communications, more realistic appraisal of performance under stress, greater preference for and reliance towards automation, and propensity toward following rules and order. Items were then combined into their respective scales (of work values, command, communications, etc.) to calculate scale-level scores.

To identify cultural differences between Western, TCK, and Asian cultural groups, rank order comparisons at the item-level, and one-way Analyses of Variance (ANOVAs) at both the item and scale level (scales of work values, command, communications, etc.) were conducted. Post-hoc t-tests between cultural pairs (Western-TCK; TCK-Asian; or Western-Asian) were used to identify whether a particular cultural pair was responsible for any observed cultural differences.

Universally Endorsed Values

To find items which were universally accepted or rejected by pilots from all cultural groups, all 59 survey items were put into culture-specific ranking tables (ranked by mean item scores, in descending order). These tables were then crosscompared to identify items which were concurrently ranked in the top five

(highest scoring) or bottom five (lowest scoring) of all three cultural nations (see Table 1).

Following Helmreich & Merritt's interpretation[5, pp.66], items which garnered the same high or low scores across all cultural groups represents universally shared values (of strong agreement or disagreement) by all pilots regardless of culture.

Items universally endorsed as important (found in the top five of all cultures) were related to employment security ("have security of employment") and work-life balance ("have sufficient time left for personal or family life"). On the other extreme (found in the bottom five of all cultures), there was strong universal disagreement toward autocratic command styles (the item "Captains who encourage suggestions are weak leaders" ranked last for all cultural groups). The top and bottom five scoring items (across all 59 survey items) for each culture are presented in Table 1, with items concurrently ranked in the top and bottom five of all cultural groups shaded in grey.

[Table 1 here]

Work Values

Comparing the 12 work values items based on rank order by item scores, Westerners and TCKs produced similar sequences, with *independence* items having the highest and second highest scores (reflecting high importance), followed by items representing *relations*, *rewards*, and lastly *order*. Although Asian pilots similarly ranked the *independence* item of "time left for personal or family life" as the most important work value, pilots of Asian backgrounds perceived greater importance in *rewards* in comparison to Westerners and TCKs (see Table 2).

[Table 2 here]

Confirming the above, significant cultural differences between the three cultural groups were found in the work values subscales of *independence* (F(2,313)=12.39, p<0.01, η2=0.07) and *order* (F(2,421)=3.67, p<0.05, η2=0.02). The split between the Western-TCK group and their Asian counterparts was also apparent when the cultural groups were compared in a pairwise manner. For the *independence* subscale, whilst the effects between the Westerner-TCK pair were non-significant (t(251)=0.47, p=0.64, η2<0.01), there were significant differences between Asians and TCKs (t(175)=3.88, p<0.01, η2=0.079) and between Asians and Westerners (t(200)=4.72, p<0.01, η2=0.100). Similarly, for the *order* subscale, pairwise comparisons found no significant effects between Westerners and TCKs (t(338)=0.83, p=0.40, η2<0.01), but a small, significant effect between the TCK-Asian (t(234)=-2.67, p<0.01, η2=0.029) and Western-Asian (t(270)=-2.11, p<0.05, η2=0.016) pairs.

Flight Management Attitudes

Flight management attitudes were assessed by items drawn from Helmreich & Merritt's FMAQ[5]. Table 3 records scale scores (means and SD) by cultural group.

[Table 3 here]

Attitudes Toward Command

Overall, there was a significant cultural effect in attitudes toward command between Western, TCK, and Asian groups (F(2,931)=5.53, p<0.01, η2=0.01), with Asian pilots having a higher score on this scale in comparison with their Western and TCK colleagues (see Table 3). Pairwise comparisons confirmed that the variations observed were once again caused by a split between the Western-TCK group (who preferred shallower command gradients) and their Asian colleagues. Western-TCK

pairwise differences in attitudes toward command were non-significant (t(746)=-0.69, p=0.49, η2<0.01); whereas moderate (t(520)=-2.59, p<0.01, η2=0.013) and large (t(596)=-3.20, p<0.01, η2=0.017) effects were respectively observed in TCK-Asian and Western-Asian comparisons.

Attitudes Toward Communications

Cultural differences were not detected in the *attitudes toward communication* scale, with ANOVA tests producing non-significant results (see Table 3 for scalelevel scores).

Performance Under Stress

Across the two stress subscales (*my stress* and *others' stress*), the composite means of all three cultural groups concurrently fell within the range of 3.22 to 3.79 (on a five-point scale, see Table 3), indicating generally positive attitudes to stress evaluation and stress management.

Significant differences were detected on the *my stress* subscale (F(2,628)=5.46, p<0.01, η2=0.017) with Western and TCK pilots being more pragmatic, and Asian pilots being relatively more idealistic in their assessment of own performance under stress (see Table 3). Further de-composing the ANOVA results using post-hoc t-tests found non-significant differences between Westerners and TCKs (t(504)=0.09, p=0.92, η2<0.01), but significant differences between TCKs and Asians (t(350)=3.01, p<0.01, η2=0.025) as well as between Westerners and Asians (t(402)=3.08, p<0.01, η2=0.023).

Cultural differences were non-significant on the *others' stress* subscale.

Rules and Order

Tripartite cultural differences were statistically significant on the *rules & order* scale (F(2,527)=7.213, p<0.01), with pairwise comparisons showing non-significant cultural differences between Westerners and TCKs (t(423)=0.44, p>0.05, η2<0.01), but significant differences for the TCK-Asian (t(293)=-3.65, p<0.01, η2=0.044) and Western-Asian (t(338)=-3.34, p<0.01, η2=0.032) comparisons. The *rules & order* scale therefore also displays the split between the Western-TCK cluster and the distinct Asian group. Cultural differences crossed the neutral mid-point, with Western and TCK pilots having slightly negative attitudes to rules and procedures, and Asian pilots in slight agreement (see Table 3).

Attitudes Toward Automation

The pilots' attitudes toward automation were measured across two subscales of *automation preference* and *automation reliance*. In addition, there were seven survey items which were not assigned to any subscale, but individually provide insight about the pilots' attitudes towards automation.

Survey results showed statistically significant cultural differences in *automation preference* (F(2,417)=5.04, p<0.01), with Asian pilots having greater preference for automation followed by their TCK and lastly Western colleagues (see Table 3). Differences between Asians and TCKs were non-significant (t(231)=-0.95, p=0.35, η2=0.00). Westerners were significantly different to both TCKs (t(336)=-2.33, p<0.05, η2=0.016) and Asians (t(267)=-2.83, p<0.01, η2=0.029).

Cultural differences were not detected in the *automation reliance* subscale.

The item "my company expects me to always use automation", which was not assigned to either the automation *preference* nor *reliance* subscales, was particularly

intriguing as the survey was distributed to pilots employed by the same company and hence the company's expectation should be the same. The variations for this item, therefore, are most indicative of innate differences in the self-perception of what pilots *think* the company wants them to do. Statistically, this item had the widest range (1.02) of all 59 survey items, with the item mean for Asians being highest at 4.30 (sd=0.66), followed by TCKs at 3.53 (sd=1.18) and Westerners at 3.28 (sd=1.31). These means differed significantly ($F(2,102)=5.42$, $p<0.01$), suggesting a high probability that cultural differences existed.

Cultural Dimensions

Cultural dimension scores were calculated for each group using a direct application of Hofstede & Minkov's (2013) formulae. These are presented in Table 4. The IDV dimension displayed the Western-TCK and Asian split, with Western and TCK pilots being similarly individualistic, whereas for the PD and UA dimensions, TCKs were in the middle between Western and Asian pilots.

[Table 4 here]

Discussion

The results of this study support the notion that TCKs as aviators form a distinct *cultural nation*. Of the work values, flight management attitudes, and cultural dimension scales measured, TCKs either behaved similarly to Westerners, had more extreme scores than Westerners on the East-West spectrum, or scored halfway between Western and Asian groups. They were not similar to Asians on any measure and never eclipsed Asians on the Eastern side of the East-West continuum (see Table 3). Such disparity proves that TCKs are neither fully assimilated into either Western or Asian cultures, nor can they be considered culturally as "middle of

the pack" between Western and Asian groups as may be expected of their "East meets West" backgrounds.

Stronger Belief in Crew Communications

Of the three cultural groups, TCK pilots had the strongest belief in crew communications (*attitudes toward communication* scale, see Table 3). They were "more Western than Westerners", eclipsing Western pilots on the East-West spectrum.

As the *communications* scale represents pilots' beliefs not just in crew communications, but also in their propensity to speak up and to voice a different opinion, the findings of this study are congruent with existing research which found that TCKs are inherently more dependent on communications to minimize misunderstandings[14]. Additionally, as the respondents of this study are employed in a culturally diverse airline, the TCK group's higher *communications* score may be reflective of the fact that they are naturally more at ease in communicating and translating between diverse groups[12].

Nevertheless, despite TCKs' relatively higher score on this scale, the average *communications* score for all three cultures were concertedly greater than 4 (on a 5point scale). This suggests that attitudes toward communications were universally strong across-the-board. This finding is in agreement with previous research which found that pilots of multi-cultural airlines, through their experience in working in multicultural environments, will place greater value, spend more effort, and have an increased awareness of the importance of communications in the cockpit[1].

Western Cultural Dominance

In another group of metrics, TCKs formed a similar cultural cluster with Westerners, having comparable scores on the values and attitudinal scales assessed by the survey. These include the *work values*, *attitudes toward command*, *my stress*, and *rules & order* scales (see Tables 2 & 3). In contrast, TCKs did not share any similarities with Asians on any of the measured scales and dimensions, suggesting that Western culture had dominating influence in multicultural (TCK) individuals.

The observed ascendency of Western culture was unlikely to be due to differences in TCKs' home-host country combinations. The TCK sample in this study consisted of a diverse group of ethnically Western, ethnically Asian, and mixed parental culture TCKs. In any case, even with consideration of the slightly larger sample of ethnically Asian TCKs in this study, the data should theoretically present an Asian skew, which was not the case. The findings are thus in agreement with research in international schooling which found that a preference for Englishlanguage education based on internationally recognized (most commonly Western) syllabi amongst globally nomadic families makes it more likely for TCKs to adopt Western values than vice versa[3].

Specifically, both TCK and Western pilots' *work values* preferences followed the sequence of *independence*, *relations*, *rewards*, and lastly *order*. In comparison, Asian pilots perceived greater importance in *rewards*' (see Table 2). The finding of greater *independence* amongst Western pilots is in agreement with existing studies which found crew members from individualistic, low context cultures to be more independent and self-reliant[2]. TCKs' greater preference for *independence* is also

reflective of previous research which found TCKs to place greater values on their own, individual goals and aspirations[4].

For flight management attitudes (see Table 3), Westerners and TCKs similarly preferred shallower command gradients (lower *command* scale score), had similarly pragmatic assessments of one's own performance under stress (higher *my stress* score), and in general have lower dependency and less preference for set rules and procedures (lower *rules & order* score). Following Engle's classifications[2], the TCK culture would, similar to Westerners, be classified as "low context". The finding of a preference for shallower command gradients (characteristic of high IDV cultures) in conjunction with the low *rules & order* scores is also congruent with the results of Merritt's study which found that countries with individualistic cultures tend to indicate less preference for rules and procedures[10].

It is imperative to understand that whilst the comparison between the Western-TCK cluster and Asian groups may give the impression that Asian pilots favored autocratic command styles and were reluctant to acknowledge their own limitations under stress, in reality it is the opposite. On the *command* scale, the scores for all three cultural groups were unanimously below mid-point (3, neutral; see Table 3). Although Western and TCK pilots had *very* low scores, Asian pilots still had low averages, and were therefore nevertheless still in general disagreement with autocratic command styles. This supports Wang & Wu's observation that leader dominance is generally weakened amongst highly competent crews with complementary skill sets[15].

Similarly, all three cultural groups had scores above mid-point for the *my stress* scale (see Table 3), suggesting generally realistic attitudes in self-assessment

of stress. An exception to this pattern was found in the *rules & order* scale which presented cultural differences crossing the neutral mid-point (see Table 3). The finding of Asian pilots' positive attitudes and Western pilots' negative attitudes toward rules and procedures have been observed in previous research[2]. Possible explanations for TCKs' slightly negative attitudes are that TCKs pick up Western values from educational exposure[3]. Another reason is that as TCKs inherently lack a sense of belonging in relation to others, they develop greater loathing towards following rigid rules and procedures set by others[3,12].

Between Two Worlds

Congruent with TCKs' "East meets West" identities, TCK scores fell in the middle between Western and Asian scores on a number of scales. This was the case in the *automation preference* scale, and in the cultural dimensions of *power distance* (PD) and *uncertainty avoidance* (UA).

Previous findings of TCKs' Western, or more-than-Western, inclinations have proved that it is over-simplistic to assume that the TCK pilots' "middle of the pack" score on these measures are simply because TCKs are themselves transculturally "East meets West".

The TCKs sampled in this study ranked in-between Westerners and Asians for *automation preference* (see Table 3), but were similar to Westerners being high in the individualism (IDV) dimension (see Table 4). This finding did not fully correspond with Helmreich & Merritt's research which found that pilots' preference for automation can be predicted by IDV (individualistic pilots dislike automation as it robs them of autonomy)[5]. If Helmreich & Merritt's[5] findings were applicable to this study's participants, then the TCK pilots sampled should, in theory, have Western or close-

to-Western *automation preference* scores, but this was not the case. This mismatch between IDV and *automation preference* in this study can possibly be due to a variation in methodology. In Helmreich & Merritt's study[5], they collected data from 36 airlines in 23 countries, and made an assumption that the resultant differences must have been solely due to differences in national culture between the 23 countries. It is entirely possible that the variations may in fact have been due to organizational differences between the 36 airlines. Their study also consisted of pilots operating 13 different types of aircraft: it is also possible that, for example, pilots operating aircraft with less capable automation features, regardless of national culture, will have less preference for automation. The argument here, therefore, is that with a more homogenous sample of pilots participating in this study (pilots in the same airline, operating similar aircraft), this study's findings were more truly reflective of differences in national culture as training, organizational, and professional differences are better controlled. By similar logic, another possible reason is that *automation preference* may in fact be determined more so by organizational culture, rather than individual pilots' IDV levels. Dahlstrom &

Heemstra conducted observations in a similarly multi-cultural airline and found that in such multi-cultural environments where there is no single, dominant national culture, it may well be the organizational culture that has controlling influence over certain attitudes[1].

The *power distance* (PD) dimension also had interesting results. Western pilots surveyed had the highest PD, followed by TCKs, then Asians (see Table 4). This rank order was surprising as it was completely reverse of existing research which invariably presents Asian societies as having higher PD than Western cultural groups[2,5,9]. A closer inspection of previous research offers clues to the source of this

disparity. Helmreich & Merritt found that Filipino pilots were able to overcome their culturally high PD by structuring their flight decks in an environment where Captains are seen as a father figure in a family "in-group", rather than as a hierarchically superior commander[5]. In the airline surveyed, new pilots who join without previous experience will necessarily have to spend time in the airline's ab-initio training program, thereby becoming an "in-group" of "schoolmates" with their colleagues.

Closer inspection of the survey results shows that a higher percentage of pilots of Asian backgrounds joined the airline with no previous experience, and hence had to go through the airline's ab-initio training. Asian pilots' low PD scores in the findings of this study, therefore, were possibly due to greater influence from "in-group" membership.

Conclusions and Recommendations

The results of this study have proven that TCKs do indeed form a distinct cultural nation with unique values and attitudes that are dissimilar to that observed in other (Western and Asian) cultural groups. By presenting a profile of the 'TCK pilot' using well-established measures of flight management attitudes and Hofstede's cultural dimensions, the results of this study adds to previous research by highlighting the strengths, weaknesses, and characteristics of TCK pilots, which may contribute to changes and improvements in human factors applications. In summary, it was found that TCKs had slightly more positive attitudes toward interpersonal communication in comparison to Western and Asian pilots. TCKs were also Western-inclined, being almost as individualistic (high IDV) as Westerners, and displaying similar work values preferences (giving high importance to independence from work), attitudes toward command (preferring shallower command gradients), self-evaluation

of their own performance under stress (relatively more pessimistic), and slightly negative attitudes to rules and procedures. There were no differences between the three cultural groups for automation reliance, and pilots of all cultures universally endorsed the importance of employment security and work-life balance, whilst universally disfavoring autocratic command styles. The results also showed TCK pilots to be in-between Western and Asian groups in the cultural dimensions of *power distance* (PD) and *uncertainty avoidance* (UA).

By considering the TCK pilot population as a standalone cultural nation with unique cultural characteristics, positive improvements can be made in CRM training, airline management, as well as training design. CRM programs with greater emphasis on team building and rule following will help overcome TCKs' inherent high individualism and negative attitudes toward rules & order, bringing them closer to the global ideal of low IDV, low PD, and high UA[2]. For airline management, the finding that TCKs share the same work values as Westerners means that when managing job morale or labor disputes with TCKs, it is best to consider them as a 'Western' group with Western desires and values. Training design and delivery can also be adapted in response to the findings of this study. People of Western cultures work harder on a task if told they are successful, whereas Asians work harder if told they have failed[11]. The finding of TCKs' Western inclination means a 'Western' approach will be more suitable when training TCKs. Training program designs which focuses more resources on easily amenable traits (e.g. automation reliance) and fewer resources on strongly culturally rooted behaviors that are more resistant to change (e.g. automation preference) can also improve training efficiency by ensuring that training concepts are in harmony with cultural attitudes and that limited resources are allocated where there is a greater likelihood for positive training outcomes[6,13].

Potential topics for further research include expanding the measures to include mental processes with direct operational consequences, such as information acquisition and decision making strategies, and also to investigate cross-cultural effects on cultural spectrums other than the Western-Asian one measured in this study.

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Table 1

Table 1. Items concurrently ranked in the top and bottom five of all cultural groups, amongst all 59 survey items

Item	Rank order by cultural group (# of 59)		
Top 5 (highest scoring)	**Western**	**TCK**	**Asian**
Have sufficient time left for your personal or family life?	1	1	4
Have security of employment?	2	3	1
Bottom 5 (lowest scoring)	**Western**	**TCK**	**Asian**
Junior crew members should not question the Captain's or senior crew members' decisions.	57	58	58
Captains should encourage crew member questions during normal flight operations and in emergencies.	57	57	56
Captains who encourage suggestions from crew members are weak leaders.	59	59	59

Table 2

Table 2: Rank order of work values items by cultural group

Item	Subscale	Rank order by cultural group (1=highest; 12=lowest)		
		Western	TCK	Asian
Have sufficient time left for your personal or family life?	Independence	1	1	1
Live in an area desirable to you and your family?	Independence	2	2	4
Work with people who cooperate well with one another?	Relations	3	3	4
Have an opportunity for high earnings?	Rewards	4	4	3
Have challenging tasks to do, from which you get a personal sense of accomplishment? Maintain good interpersonal relationships with	Independence	5	7	8
fellow workers or crew members? Have an opportunity for advancement to	Relations	6	6	6
higher-level jobs?	Rewards	7	5	2
Find the truth, the correct answer, the one solution?	Order	8	8	7
Have a warm relationship with your direct superior?	Relations	9	9	9
Know everything about the job, to have no surprises?	Order	10	11	12
Have a changing work routine with new, unfamiliar tasks?	Order	11	10	10
Observe strict time limits for work projects?	Order	12	12	11

Table 3. Flight management attitude scores by cultural group

	Scores by cultural group					
	Western		TCK		Asian	
Flight Management Attitude Scale	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Command	1.79	1.09	1.85	1.06	2.11	1.22
Communications	4.27	0.92	4.32	0.92	4.00	0.91
Stress						
My stress	3.59	1.15	3.59	1.10	3.22	1.04
Others' Stress	3.79	1.12	3.75	1.09	3.61	1.14
Rules & Order	2.78	1.10	2.73	1.08	3.20	1.00
Automation						
Preference	2.82	1.26	3.13	1.20	3.29	1.29
Reliance	3.28	1.36	3.33	1.31	3.25	1.36

Table 4

Table 4. Cultural dimension scores by cultural group

Cultural Dimension	Scores by cultural group		
	Western	TCK	Asian
Individualism-Collectivism (IDV)	66.6	66.3	22.7
Power Distance (PD)	62.6	48.5	26.3
Uncertainty Avoidance (UA)	33.6	43.5	53.4