Workload study: What it tells us about our job

Psychological, physiological, physical and performance factors were explored in this study exploring stress and the work environment of professional conference interpreters.

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Ask any conference interpreter whether their profession is stressful and they will give you a quizzical look. Everybody knows it is. But when in the early nineties the US Federal Trade Commission challenged AIIC over its mandatory working conditions, those defending its arguments regarding team strength, rest days, travel conditions, etc. found that they had little empirical evidence to support a largely intuitive position. The Workload Study grew out of that realisation.

Consultants in the UK, Austria, Switzerland and Israel were approached and after careful examination of the proposals, AIIC contracted Mertens Hoffman of Tel Aviv. They had extensive experience in the field of occupational health and would work with the Israeli National Institute for Occupational and Environmental Health.

Their proposal covered the four sets of parameters defined by the Research Committee (RC): psychological, physiological, physical and performance, and the relationship between them. Did certain physical factors correlate with performance or physiological data? Did there appear to be a link between psychological findings and performance? These and many more questions were addressed in this large-scale study.

The results are now in and the findings will be disseminated in a variety of formats, including:

- this article in Communicate!
- an abridged version of the full report (approx. 25 pp with an executive summary) to be sent to the organisations who allowed us to make booth measurements, to the equipment suppliers who collaborated with the study by recording the proceedings for us, as well as to the major employer organisations with whom AIIC maintains regular contact;
- a set of briefing notes for AIIC PR officers and Regions. AIIC Regions will be encouraged to translate them into their local language(s) and send them to equipment suppliers, main conference venues, and large employers. A PowerPoint presentation will also be prepared as a back-up;
- presentations by AIIC representatives at meetings of organisations like the Joint Industry Council (JIC) and International Association of Professional Congress Organisers (IAPCO);
- the full report (128 pages plus annexes), downloadable from this website;
- a research-oriented article to be published in a forthcoming issue of ‘Interpreting’ in which methodological issues will be addressed and the results discussed.

Study Design & Results
Psychological, physiological, physical and performance factors were explored. A major focus of the study was to check for correlations between them. The consultants first went through the relevant literature in order to understand what had already been studied (e.g. the 1982 Cooper report) and to define a baseline for the physical and physiological parameters.

**Psychological factors**

A questionnaire was sent to a random sample of members in order to establish perceived levels of stress and job satisfaction among interpreters. 1502 were sent out, 50 returned (change of address) and 607 replies received resulting in a response rate of 41%, which compares favourably with other AIIC surveys. During analysis, the replies were weighted to reflect the correct proportions in membership. All 256 staff interpreters were sent questionnaires but only 67 replied (26%) which makes the permanents’ sample less representative than the freelancer one. The RC asked Mertens Hoffman particularly to look at differences between the two categories to see what useful conclusions could be drawn. Replies show that staff interpreters work on average 167 days a year versus 100 for freelancers, but the variations in the first category are very wide (standard deviation 59 versus 41 for freelancers). The staff interpreters’ main source of dissatisfaction is lack of mobility in the hierarchy (48% of respondents), but 78% expressed satisfaction with job security and 68% with their current workplace.

On the basis of the replies, levels of mental and physical exhaustion, cognitive fatigue and mental stress are higher for interpreters than for hi-tech workers and similar to the two other sectors for which comparable data was available: teachers and senior officers (in the Israeli army). The chief stressors mentioned are related to text and delivery (fast or undisciplined speakers, read texts, too little advance documentation, difficult accents) and to poor booth conditions, which appear to affect freelance interpreters more than permanents, as does frequent travel. The questionnaire responses confirmed interpreting as a high stress occupation and some of the physiological data produced indications of chronic stress. Overall, women showed higher burnout levels than men, burnout being defined as a combination of physical fatigue, emotional exhaustion and cognitive weariness. Staff interpreters reported more burnout than freelancers.

High levels of job satisfaction were expressed by respondents: 88% saying that they were either very or fairly satisfied with their profession, with only 10 % not expecting to be in it in two years time and 23% saying they would not recommend it to a friend. 91% of respondents were either satisfied or very satisfied with subject variety in their work; 84% with its challenging nature and with relations with colleagues; 78% with international contacts; 75% with diversity of venues; 73% with lack of routine; 68% with remuneration; 61% with the adrenaline rush; 57% with doing a responsible job; 54% with professional status, but only 42% with travel and 40% with the prestige of the profession – said by 74% to have diminished in recent years.

When asked about their performance 66% were satisfied to a great or considerable extent and only 3% to a slight extent or not at all. 53% reported that under stress their accuracy diminished and 57% said that stress lowered their level of satisfaction with their performance. 66% reported high or very high levels of work-related stress and 40% saw this as improving performance whereas 36% considered it harmful. 70% of the respondents considered themselves successful or very successful in dealing with work-related stress and only 6% unsuccessful. Videoconferencing was perceived as having a negative impact upon performance by 73% of the respondents having experienced it.

A questionnaire was also distributed to the interpreters who acted as subjects for the physiological and performance measurements. These results show that 94% of the respondents considered their boothmates to be one of the factors contributing to a sense of well-being that day, 63% felt the
subject to be important and that they were doing a good job and 37% thought the subject interesting. Only 19% of the respondents in mobile booths were satisfied with the booth conditions as against 49% in permanent booths. 62% of the latter were satisfied with seating and body posture as against 33% in mobile booths, whereas only 6% of the respondents felt they had a large enough work surface and 19% that the booth was big enough (against 57% and 69% respectively for interpreters in permanent booths). Only 13% of the mobile booth occupants felt they could see the speakers and visual aids comfortably, against 68% for fixed booths. About 75% of the interpreters complained of ‘stale air’, at the end of the working day. 58% felt they lacked energy and 49% felt tired. Subjects were asked about the factors that make their most stressful turn stressful: 54% replied fast speaker, 50% textual complexity, 48% the subject, 34% speaker reading text, 31% difficult accent and 24% booth discomfort. Only 13% of the mobile booth occupants felt they could see the speakers and visual aids comfortably, against 68% for fixed booths. Just under half felt that their performance declined during a stressful turn (this was most marked in mobile booths). Similarly performance is perceived to decline as the number of turns increases.

**Physiological factors**

The physiological data measured were ambulatory blood pressure (AmBP), heart rate (HR) and cortisol levels (cortisol is a stress hormone and is widely recognised as a stress marker). Forty eight interpreters (35 women and 13 men), at 8 different conferences in Germany, Israel, the Netherlands and UK, agreed to be subjects and the physiological data was measured over a 20-24 hour period. This involved wearing monitors which recorded data every 20-40 minutes during the day and every 60 minutes overnight. It was an uncomfortable experience and the profession as a whole owes them a debt of gratitude for being willing to subject themselves to it. Cortisol was measured four times over the period (15 mins after awakening, mid-morning, mid-afternoon, evening). The physical parameters of the booths in which they were working were also measured (cf. Physical section) and six 2-minute segments of their interpretation (and corresponding original) were recorded in the course of the day (cf. Performance section).

**Findings**

1. AmBP, HR and cortisol measurements over 24 hours demonstrated the stressfulness of the interpreters’ job. The rates were highest when the interpreters were ‘on mike’ (a result confirmed by the interpreters’ subjective assessment of work load and tension as indicated by the booth questionnaires). Of the 48 interpreters, five (2 men, 3 women) were hypertensive and they showed the greatest rise in AmBP and HR over the already high readings recorded when asleep. Only one of the five hypertensive subjects was aware of having high blood pressure – which emphasises the need for interpreters to monitor blood pressure on a regular basis given the considerable health risks involved in leaving the condition untreated. Women showed higher cardiovascular responses to the interpreting task than men, but in general BP levels in interpreters were comparable to BP levels of people in other high-stress occupations. Salivary cortisol levels were comparable to workers in other high-stress occupations with high baseline levels (i.e. those measured upon awakening in the morning) providing evidence of chronic stress. Interpreters whose questionnaire replies indicated high subjective tension showed significantly higher baseline (i.e. morning) cortisol levels than those reporting lower tension. High baseline levels are an indication of chronic stress. Values measured for both salivary cortisol and cardiovascular parameters were highly convergent in both men and women and were also congruent with subjects’ subjective ratings of high workload and tension.

**Physical factors**
This is the area of the study where the findings cause the most immediate concern and the RC will be making recommendations to AIIC Council on possible follow-up. The principal inadequacies relate to CO2 levels, relative humidity and temperature. The values established for all the parameters were compared to the values of the relevant ISO standard. Details of the methods and equipment used can be found in the full report published on the AIIC website.

Findings

1. Mean CO2 levels in mobile booths were close to the level rated ‘unacceptable’ by ISO (i.e. above 1000 ppm) after 1.5 hours and remained at that level for the rest of the day with a peak to above 1000 ppm after 3 hours. The average value over the working day (1.5-6.0 hours) was 992.3, i.e. very close to ‘unacceptable’. The highest mean value recorded for the working day was 1775 ppm. The percentage of ‘unacceptable’ booths was 37% and of ‘poor’ booths (801-1000 ppm) 42%, i.e. 79% of all mobile booths measured were either unacceptable or poor by ISO standards.

2. In permanent booths the situation was better but still in the range rated ‘poor’ by ISO. The mean value over the working day was 870.8 with the highest mean value for the day being 1375 ppm. 33% of the booths were rated ‘unacceptable’ and 27% ‘poor’, i.e. 58% in total. The corresponding mean values for permanent and mobile booths together were 927 ppm over the working day, with 29% rated ‘unacceptable’ and 34% ‘poor’, totalling 63%.

3. Oxygen levels were normal in all the booths and remained constant throughout the day.

4. Relative humidity levels of between 50% and 60% are considered good, 45-65% is acceptable whereas values either above or below this range are considered uncomfortable. 100% of the mobile booths were in the ‘uncomfortable’ range after 6 hours as were 48% of the permanent booths, although the average humidity was 47%, i.e. just inside the recommended range. This discomfort was due to very low humidity, causing a sensation of dryness.

5. The recommended temperature comfort zone is between 20-21ºC, with values below 18ºC and above 22ºC deemed uncomfortable. 100% of the mobile booths reached uncomfortable levels after 3 hours, 95% after 1.5 hours (mean value over the working day: 24.4º), while 77% of the permanent booths were in the discomfort range over the working day (mean value 22.7º), 71% after 3 hours.

6. Air velocity (i.e. speed at which air flows at face level) of 11-13 m/min is considered the most comfortable and a range of 6-15 m/min is acceptable. Values outside these limits are unacceptable. Values measured in 87% of the booths were unacceptably low, giving rise to complaints of ‘stale air’.

7. Lighting is covered by the ISO standards for mobile and permanent booths. In most cases the consultants found that although the potential illumination was sufficient to meet the standard, in 100% of the cases measured interpreters chose to work with insufficient light. Although many dislike the ‘fishbowl’ effect, working with insufficient light could cause eye strain and add to tension.

8. Ventilation and fresh air flow are assessed according to the percentage of fresh air blowing into the booth, the number of air changes per hour and the volume of fresh air per person per time unit. In mobile booths the number of air changes per hour (7) was sufficient, but the volume requirement per person per time unit was not met. In permanent booths the frequency was insufficient. The consultants draw attention to the need for fresh air rather than recirculated air which contains higher levels of CO2 and water vapour.

The consultants formulated a number of recommendations for improving physical booth conditions: larger mobile booths; ventilation systems for permanent booths which are independent of the conference hall system; airflow at a velocity of 9-15 m/min; efficient temperature and humidity
regulators in booths; turning on ventilation systems 1 hour before the start of meetings and leaving them on all day; leaving booth doors open during breaks and overnight; regular cleaning of booths, including seating and carpets. Lights should be turned off when the booth is unoccupied as they are a source of heat.

Performance factors

The performance data was sampled three times in the course of the working day: at the beginning and end of three interpretation turns. The corresponding original was also recorded at the start, in the middle and at the end of the day. Each sample consisted of two segments of 2 minutes - one from the start and the other from the end of a turn. Each interpretation was evaluated by two jurors, professional interpreters having the same languages as the interpreter. The parameters evaluated were: error rate, omission rate, addition rate, grammatical mistakes, word choice, phrasing and delivery. Each was evaluated on a scale from 1 (very unsatisfactory) to 5 (very satisfactory). The mean values for performance quality were very consistent throughout the day, with the lowest being 4.12 (first segment in end-of-day sample, standard deviation .53) and the highest 4.46 (first segment of the day, SD .33). This shows a slight tailing off in performance towards the day’s end. Concordance between jurors was high with significant differences occurring in only 11% of the evaluations.

There did not appear to be any correlation with the physiological and physical data measured, although AmBP and HR values were highest when subjects were ‘on mike’ and high levels of blood pressure ‘on mike’ showed a weak correlation to reported negative effects of stress on performance. No connection was found between CO2 levels and performance quality, although low humidity correlated weakly with a lower performance evaluation, as did working in a mobile booth. Although the correlations between measures of stress (objective and subjective) and performance are weak, this is in keeping with findings in the literature which indicate that highly competent and motivated workers maintain high levels of performance in the presence of a variety of stressors. Other studies show, however, that there are physiological costs associated with maintaining these high levels in such conditions: physiological exhaustion and post-work stress. This study shows that interpreters are subject to these costs: high awakening cortisol levels and high AmBP when working, as well as self-reports of negative effects on physical well-being.

Conclusions

1. Simultaneous interpretation is a high-stress occupation performed by competent and motivated professionals. Although interpreters appear to have developed coping mechanisms for dealing with stress, there are indications that there is a physiological cost associated with these levels of expertise. Interpreters should undergo regular blood pressure tests to ensure early detection of hypertension. The RC recommends that AIIC consider the feasibility of undertaking a longitudinal health study of interpreters.
2. Booth conditions are frequently poor or unacceptable when measured against the applicable ISO standards, particularly in mobile booths. It appears a matter of some urgency to correct the situation. In the absence of remedial action, interpreters should leave booth doors open and turn lights off during breaks. If air-conditioning or ventilation systems are available, technicians should be asked to turn them on one hour before the start of the meeting. Temperature and humidity regulators should be installed. Interpreters work with insufficient levels of light, often by choice.
3. The RC recommends that AIIC considers exploring the possibility of collaborating with experts to design an ‘ergonomic booth’.
4. Interpreters report high levels of job satisfaction although 74% consider that the prestige of the
profession has declined in recent years.

5. The study findings indicate that textual complexity, insufficient preparation possibilities and poor delivery are considered the main sources of stress when interpreting. This underlines the need for consultant interpreters, team leaders and chief interpreters to raise user awareness of AIIC’s recommendations to speakers and conference organisers.

6. A significant proportion of staff interpreters are dissatisfied with possibilities for mobility in the organisation’s hierarchy, but value job security (78%) and are satisfied with their current workplace (68%). The RC regrets the relatively small number (67) of respondents in this category.

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Finally, special thanks to the 48 colleagues who subjected themselves to 24 hours of discomfort by allowing themselves to be wired up.

Download the full report and annexes from: http://www.aiic.net/ViewPage.cfm/article467

Jennifer Mackintosh is the convener of AIIC's Research Committee.

Recommended citation format: