



DRDC Toronto No. CR 2010-055

# **Development of an E-Prime based computer simulation of an interactive Human Rights Violation negotiation script**

by:

Courtney D. T. Hall, Cheryl L. F. Karthaus, Barbara D. Adams, and Brian G. Mangan

Humansystems<sup>®</sup> Incorporated  
111 Farquhar St.  
Guelph, ON N1H 3N4

Project Manager:  
Barbara D. Adams  
(519) 836-5911, ext: 249

PWGSC Contract No. W7711-088128/001/TOR  
Callup No. 8128-04

On behalf of  
DEPARTMENT OF NATIONAL DEFENCE  
as represented by  
Defence Research and Development Canada Toronto  
Toronto, Ontario, Canada  
M3M 3B9

DRDC Toronto Scientific Authority  
Dr. Matthew Duncan  
(416) 635-2000 (ext. 3211)

December 2010



Author

---

Barbara D. Adams  
Humansystems Inc

Approved by

---

Dr. Matthew Duncan  
Collaborative Performance and Learning Section

Approved for release by

---

Dr J. V. Baranski  
Chair, Document Review and Library Committee

The scientific or technical validity of this Contract Report is entirely the responsibility of the contractor and the contents do not necessarily have the approval or endorsement of Defence R&D Canada

© HER MAJESTY THE QUEEN IN RIGHT OF CANADA (2010)  
as represented by the Minister of National Defence  
© SA MAJESTE LA REINE EN DROIT DU CANADA (2010)  
Defence nationale Canada

## Abstract

This report describes the method of developing an E-Prime computer simulation of an interactive Human Rights Violation (HRV) negotiation. An HRV negotiation script was originally developed under the PWGSC Contract No. W7711-007893/001/TOR Callup No. 7893-12. The HRV negotiation script was designed based on a training scenario developed by the Canadian Forces (CF) for use at the Peace Support Training Centre (PSTC) at Canadian Forces Base (CFB) Kingston. The computer simulation developed in this project is intended to be used for future research and as a possible training platform for use at the PSTC.

## Resume

Le présent rapport décrit comment un programme de simulation par ordinateur fondé sur le logiciel E-Prime a été développé pour la négociation interactive en cas de violation des droits de la personne (VDP). Un scénario de négociation pour les cas de VDP a été établi initialement en vertu d'un contrat de TPSGC : le contrat n° W7711-007893/001/TOR, commande n° 7893-12. Ce scénario de négociation était fondé sur un scénario d'instruction développé par les Forces canadiennes (FC) et destiné au Centre de formation pour le soutien de la paix (CFSP), à la Base des Forces canadiennes (BFC) Kingston. Le programme de simulation par ordinateur qui a été développé dans le cadre de ce projet est destiné aux futurs travaux de recherche, et il servira peut-être d'outil de formation au CFSP.

# Executive Summary

## Development of an E-Prime based computer simulation of an interactive Human Rights Violation negotiation script

**Courtney D.T. Hall, Cheryl L.F. Karthaus, Barbara D. Adams, and Brian G. Mangan:  
Humansystems Incorporated, DRDC Toronto CR-2009-055; Defence R&D Canada –  
Toronto; December 2009.**

Defence Research and Development Canada (DRDC) has initiated a number of studies investigating moral and ethical decision-making (MEDM). Studies were completed during a pre-deployment training course at a Canadian Forces Base (CFB). One of the exercises involved a live simulation of a Human Rights Violation (HRV) in which United Nations Military Observer (UNMO) trainees negotiate for the safety of alleged criminals in police custody. Successful negotiations result in the civilians surviving, while unsuccessful negotiations result in the civilians being killed. Based on this scenario, Tario, Karthaus, Adams and Thomson (2008) developed an empirically based script that reflects a realistic HRV negotiation. This script consists of a number of interactions between a UNMO trainee and a police Sergeant (Sgt). The script was designed to be delivered in a testing and/or training platform. Therefore, it presents each interaction sequence with 2 or 4 choices from which the trainee must choose. The Sgt's response is then coordinated with the chosen dialogue. This report describes the employment of this script as a computer simulation. The purpose of this project was to develop a computer based HRV negotiation using E-Prime software intended to be used in a laboratory based setting.

The completed simulation was then tested with five undergraduates. Results from this piloting show a naïve participant could easily follow the negotiation and the simulation maintained their interest for the 20-30 minutes it took to complete. The simulation was successfully delivered. Acting as a preliminary validation of the script, the data from the pilot study suggests that the ideal responses within the script were not obvious enough to be selected consistently. Translating to the outcome, only one participant ended the simulation with the civilians alive; three participants decided to watch the civilians leave (civilians died) and one participant left the civilians (civilians died). Suggestions and recommendations from participants were also considered.

The HRV simulation developed in this project is anticipated to be used for DRDC research on negotiation behaviour. Successful subsequent testing and Subject Matter Expert (SME) validation may lead to the further development of the computer simulation training tool for use by the Peace Support Training Centre (PSTC) at CFB Kingston.

# Sommaire

## **Development of an E-Prime based computer simulation of an interactive Human Rights Violation negotiation script**

**Courtney D.T. Hall, Cheryl L.F. Karthaus, Barbara D. Adams, and Brian G. Mangan:  
Humansystems Incorporated, DRDC Toronto CR-2009-055; Defence R&D Canada –  
Toronto; December 2009.**

Recherche et développement pour la défense Canada (RDDC) a entrepris un certain nombre d'études sur la prise de décisions morales et éthiques (PDME). Ces études ont été menées pendant un cours de formation préalable au déploiement, dans une Base des Forces canadiennes (BFC). L'un des exercices était fondé sur la simulation d'un cas de violation des droits de la personne (VDP) dans lequel des apprentis observateurs militaires de l'ONU devaient négocier pour garantir la sécurité de présumés criminels (civils) détenus par la police. Le sort de ces civils dépendait de l'issue de la négociation : en cas de réussite, leur survie était assurée, tandis qu'en cas d'échec, ils étaient tués. À partir de ce scénario, Tario, Karthaus, Adams et Thomson (2008) ont élaboré un script empirique pour mener la négociation de façon réaliste. Ce script prévoit un certain nombre d'interactions entre un apprenti observateur militaire de l'ONU et un sergent de police. Il est conçu pour être utilisé dans les essais et/ou à l'entraînement. Par conséquent, chaque interaction comporte 2 ou 4 choix parmi lesquels le stagiaire doit choisir. La réponse du sergent de police est ensuite coordonnée avec le dialogue choisi. Le présent rapport décrit comment ce script a été utilisé dans le cadre d'une simulation par ordinateur. Le but du projet était de développer un outil de négociation empirique pour la négociation des cas de VDP à l'aide d'un logiciel E-Prime conçu pour être utilisé en laboratoire.

Le programme de simulation par ordinateur a ensuite été mis à l'essai avec cinq étudiants de premier cycle. Les résultats de cet essai montrent qu'un participant naïf pourrait facilement suivre la négociation, et la simulation a soutenu l'intérêt des participants pendant les 20 à 30 minutes qui sont nécessaires pour mener la négociation à bien. La simulation a été exécutée avec succès. Utilisées pour la validation préliminaire du script, les données de l'étude pilote suggèrent que les réponses idéales prévues par le script ne sont pas suffisamment évidentes pour que les participants les choisissent systématiquement. Cela se voit dans les résultats : un seul des participants a terminé la simulation avec les civils toujours vivants, trois participants ont décidé de les regarder partir (les civils ont été tués), et un participant les a abandonnés à leur sort (les civils ont été tués). Les suggestions et les recommandations des participants ont également été prises en considération.

Le programme de simulation développé dans le cadre de ce projet devrait être utilisé dans les futurs travaux de recherche de RDDC sur le comportement humain dans les négociations. S'il est testé avec succès et validé par les experts, il contribuera peut-être au développement d'un programme de simulation par ordinateur destiné au Centre de formation pour le soutien de la paix (CFSP), à la BFC Kingston.

# Table of Contents

ABSTRACT .....	I
RESUME.....	II
EXECUTIVE SUMMARY .....	III
SOMMAIRE .....	IV
TABLE OF CONTENTS .....	V
LIST OF FIGURES AND TABLES.....	VI
Figures .....	vi
Tables.....	vi
LIST OF ACRONYMS.....	VII
1. BACKGROUND .....	1
1.1 HRV scenario.....	1
1.2 HRV script.....	1
1.3 E-Prime .....	4
2. METHODS .....	5
2.1 Simulation development .....	5
2.1.1 Phase 1.....	5
2.1.2 Phase 2.....	6
2.2 Testing the simulation.....	13
2.2.1 Randomization.....	13
2.2.2 Feedback.....	14
2.2.4 Proof of Concept.....	14
2.3 Summary of the simulation.....	15
3. CONCLUSIONS, LIMITATIONS AND FUTURE IMPROVEMENTS .....	16
REFERENCES.....	18
ANNEX A.....	19
ANNEX B.....	20
ANNEX C.....	21
ANNEX D.....	26

# List of Figures and Tables

## Figures

FIGURE 1: ARROW GRAPHIC .....	5
FIGURE 2: FEEDBACK FROM METER-GRAPHIC.....	6

## Tables

TABLE 1: HRV COMPOSITION .....	2
TABLE 2: OVERVIEW OF STRUCTURE.....	7
TABLE 3: E-PRIME SIMULATION STRUCTURE OF THE HRV NEGOTIATION .....	12
TABLE 4: IDEAL VS. OBSERVED FREQUENCIES OVER 8 TRIALS .....	14
TABLE 5: RANGES FOR METER-GRAPHIC.....	20
TABLE 6: INTERACTION SEQUENCE FREQUENCY.....	21



## List of Acronyms

Acronym	Definition
2IC	Second In Command
CF	Canadian Forces
CFB	Canadian Forces Base
DP	Decision Point
DRDC	Defence Research and Development Canada
HQ	Head Quarters
HRV	Human Rights Violation
IS	Interaction Sequence
MEDM	Moral and Ethical Decision-Making
MEFS	Moral and Ethical Field Studies
NRB	Negative Relationship Building
NS	Negotiating Skills
P	Preliminaries
PRB	Positive Relationship Building
PSOs	Peace Support Operations
PSTC	Peace Support Training Centre
PWGSC	Public Works and Government Services Canada
RB	Relationship Building
SA	Situation Assessment
Sgt	Sergeant
SME	Subject Matter Experts
UN	United Nations
UNMO	United Nations Military Observer

# 1. Background

Defence Research and Development Canada (DRDC) has initiated a number of studies investigating Moral and Ethical Decision-Making (MEDM). Three studies were completed during a pre-deployment training exercise at Canadian Forces base (CFB) Kingston. Canadian Forces (CF) personnel receive extensive training to prepare them for deployments as United Nations Military Observers (UNMOs) on Peace Support Operations (PSOs). One of these courses combines classroom and live exercise training to assist trainees<sup>1</sup> in learning critical negotiation skills. The live training exercise involves a Human Rights Violation (HRV) in which UNMO trainees negotiate for the safety of alleged criminals in police custody. To this end, three studies examined behaviour in relation to moral intensity. This project is based on these three studies and was developed as follow-on work to the creation of an HRV negotiation script.

The HRV training scenario used at the Peace Support Training Centre (PSTC) reflects realistic events that Canadian peacekeepers may encounter in the field. However, in the current training, trainees have only one opportunity to practice and to hone their skills in this realistic negotiation. Creating a computer-based simulation may provide multiple opportunities for trainees to learn from their mistakes, and to progressively become more adept at negotiating. Moreover, given the importance of training negotiation skills, it is important to conduct further research to explore factors that influence the effectiveness of training processes. Integrating the current HRV script into a computer based simulation is one way to address both of these needs. The simulation could be used for training negotiation skills and for research in a controlled environment. The goal of the current project is to translate an existing script into a lab-based computerised simulation using E-Prime software. The sections that follow provide a brief overview of the HRV script, the software used in the computer-based simulation, the methods used in the computer simulation development, and details of the pilot study.

## 1.1 HRV scenario

The HRV scenario is a simulated negotiation using military personnel as role players between UNMOs and a local police sergeant (Sgt). The UNMOs are military personnel going through a training course before they are deployed overseas. The UNMOs are not informed of the nature of the scenarios they will encounter; thus, there is an element of surprise and uncertainty in the scenario. However, the UNMOs have been briefed on the current climate of the village and are told of potential civilian murders by local police.

The scenario begins with a woman being dragged across the road, in sight of the UNMOs, screaming for her life. The UNMOs approach a clearing where they see the woman (a civilian), the man (a local police officer), and another male civilian and male police officer. The officers are abusing (kicking and hitting) and yelling at the two civilians while the civilians are screaming for their lives. One of the police officers, the Sgt, sees the UNMOs and approaches them in an attempt to deter them from looking into the situation further. This begins the negotiation, UNMOs have the opportunity to use negotiation skills they have learned in their course. The role of the UNMOs is to try to work to negotiate a successful end to the dangerous situation, and ideally one that prevents harm to the civilians.

The dialogue between the UNMO and the Sgt varies in each negotiation. The Sgt usually will engage in the negotiation, but continuously tell the UNMOs to leave. The Sgt sticks to the story that these civilians are terrorists, they are being detained for questioning, the civilians are digging irrigation holes, terrorists murdered the Sgt's brother, and the local villages receive unequal treatment from the United Nations (UN).

## 1.2 HRV script

The HRV script that was employed in this project was developed under a previous project (Public Works and Government Services Canada (PWGSC) Contract No. W7711-007893/001/TOR; Tario, Karthaus, Adams & Thomson, 2008). Tario et al. (2008) created the script by examining video footage of the actual HRV

---

<sup>1</sup> During the PSTC training, these individuals are referred to as trainees. While discussing the simulation, these individuals are referred to as participants.

scenarios. The video footage was gathered in previous field studies (i.e., Moral and Ethical Field Studies (MEFS) I, II, III). These studies examined the effects of three variables on negotiation behaviour, namely victim proximity (MEFS I, Thomson & Adams, 2007), emotional intensity (MEFS II, Thomson, Adams, & Waldherr 2007), and team collaboration (MEFS III, Thomson, Tario, Adams & Brown, 2008). A range of behaviours, both optimal and suboptimal, were identified during this process and a coding scheme defining and delimiting these behaviours was developed. This scheme was subsequently validated by course instructors ensuring that the behaviours coded were well calibrated with the views of military subject matter experts (Thomson & Adams, 2008). At this point, the goal was to work to create a realistic script simulating the content of a typical negotiation within the context of the human rights scenario. Analysis of the coded video assisted the production of coherent, empirically based interaction sequences to simulate the flow, structure, and content of a typical negotiation. Interaction sequences were organized into key stages and themes of a typical negotiation, and simulated the natural “back and forth” of typical dialogue between the two players (the Sgt and the UNMO). Representing what was found in the video reviews, interaction sequences were developed having the trainees initiate the majority of the dialogue, about 70%, while Sgt initiated interaction sequences comprised approximately 30% of the total negotiation. Table 1 provides an overview of each stage of a typical negotiation (e.g., preliminaries), general activities within the stage (e.g., establishing relationship), critical themes (e.g., introductions), as they relate to the composition of the negotiation.

**Table 1: HRV Composition**

Stage and General Activity		Critical Themes	Composition of the Negotiation (%)
Preliminaries - Engaging/establishing relationship		Initiating Introductions Explaining General Purpose Establishing Common Ground Creating a Social Event	10%
Situation Assessment - Establishing situational awareness		Specific Situational Information Enquiring about Civilian Infraction Determining Authority Structure Seeking General Information	40%
Relationship Building - Building a positive or negative relationship	Positive Relationship Building	Empathy/Responsiveness to Sgt Asking Permission Before Acting Complimenting the Sgt Assessing Sgt's Beliefs, Values, Interests	30%
	Negative Relationship Building	Expressing a Critical Opinion of the Sgt Circumventing the Authority of the Sgt Making Demands of the Sgt Stating Relevant Regulations	
Negotiating Skills - Diffusing situation, search for alternatives, and initiate civilian contact		Diffusing the Situation Offering Suggestions Showing Empathy to the Civilians Civilian Contact	20%
<b>Total</b>			<b>100%</b>

The purpose of the Preliminaries (P) stage is to allow UNMOs the opportunity to introduce themselves and their team members, and to explain the role of the UN, as well as to establish an initial rapport with the Sgt. The four sub-components of this stage include initiating introductions (e.g., “*What’s your name?*”), explaining general purpose (e.g., “*We’re with the UN and we’re just patrolling the area*”), establishing common ground (e.g., “*I have orders from my boss too*”), and creating a social event (e.g., “*Would you like a cigarette?*”). These examples are directly from the script and could be presented to a participant during the computer simulation.

The Situation Assessment (SA) stage allows persons participating in the dialogue the opportunity to retrieve information from the Sgt to gain understanding of the key components of the situation (e.g., civilians, Sgt, police structure, surrounding area). The four sub-components of the SA stage include asking specific situational information (e.g., *“How long have you been interrogating the civilians?”*), inquiring about the civilian infraction (e.g., *“Have the prisoners been to court yet?”*), determining the authority structure (e.g., *“Who does your boss report to?”*), and seeking general information (e.g., *“How big is your village?”*).

The Relationship Building (RB) stage is meant to further build rapport between the Sgt and the UNMOs. Over the numerous negotiations reviewed by the research team during the HRV script development, most of the UNMOs showed excellent Positive RB (PRB) behaviours. However, it was also found that some UNMOs exhibited some Negative RB (NRB) behaviours. Because of this, the RB stage is divided into positive and negative behaviours. The four sub-component positive behaviours include, showing empathy or responsiveness to the Sgt (e.g., *“I’m very sorry your brother died”*); asking permission before acting (e.g., *“Can we take pictures?”*); complimenting the Sgt (e.g., *“You have a well planned policing system over here”*); and assessing the Sgt’s beliefs, values and interests (e.g., *“Do you want us to help your village?”*). The four sub-component negative behaviours include, expressing a critical opinion (e.g., *“It seems things are getting a little out of control here”*), circumventing authority (e.g., *“I want to talk to the person who gave you these orders”*), making demands (e.g., *“You should wait to leave until we call for backup”*), and stating relevant regulations (e.g., *“Do you know about the ceasefire agreement?”*).

The Negotiating Skills (NS) stage is a key component of the negotiation because it is where UNMOs are required to demonstrate the skills to maintain a calm atmosphere and attempt to keep the civilians safe. This last stage is nearing the end of the negotiation, where the Sgt tries to escort the civilians out of the area so he can murder them out of sight from the UNMOs. Without knowing these intentions, it is the UNMOs goal to negotiate for the lives of the civilians. The four sub-components of the NS stage include diffusing the situation (e.g., *“We don’t want to see anyone get mad”*), offering suggestions (e.g., *“How about we all go to the police station together?”*), showing empathy to the civilians (e.g., *“Can I offer your prisoners some water?”*), and initiating civilian contact (e.g., *“Can I just tell your prisoners to stay calm?”*).

Each interaction sequence consists of two or four UNMO dialogues, and two Sgt dialogues. The UNMO dialogues were associated with different values based on the perceived desirability of that response. Thus, navigating through this script, participants would be required to choose from either two or four different options (some optimal and some suboptimal), each linked with valences. This was true whether the UNMO was initiating or responding in the interaction sequence. These valences were used in the simulation as a performance measure to evaluate the choice and overall negotiation, as well as provide feedback to the participant (see Section 2.1). Sgt dialogues (initiations and responses) were developed with one positive and one negative option. As described in Section 2.1, the Sgt would initiate positively or negatively in accordance with the overall valence score. Likewise, the Sgt would respond positively or negatively according to the previous response chosen by the participant. For example, if the participant initiated a dialogue by choosing a negative option, the Sgt would reply negatively.

Appropriate flow of the negotiation including transition phases were also incorporated into the script. These included introduction information that would provide required information about the scenario to someone participating in the negotiation, different decision points, and information points to ensure that all participants were provided similar, critical information throughout the situation. The outcome of the negotiation (civilians live or die) was presented to participants, as well as the final cumulative score.

The final script contained a total of 140 negotiation interaction sequences with 10% of the interaction sequences relating to the preliminary stage of the negotiation, 20% to specific NS and the majority (40% and 30% respectively) to establishing SA and RB. UNMO initiated dialogues consisted of approximately 70% of the total interaction sequences while Sgt initiated dialogues consisted of approximately 30%. Note that a full description of the development of the HRV script including examples is found under PWGSC Contract No. W7711-007893/001/TOR (Tario, Karthaus, Adams & Thomson, 2008).

### 1.3 E-Prime

An E-Prime platform was used to develop the computer-based HRV negotiation simulation. E-Prime software was developed for computerized experimentation because it is specifically intended for research use (Psychology Software Tools Inc., 2009). E-Prime is a suite of applications that incorporate a drag and drop graphical interface, scripting ability using E-Basic (nearly identical to Visual Basic for Applications™), data collection, and data analysis. The E-Prime Version 2.0 was used to develop the HRV negotiation simulation.

The E-Prime interface provides a toolbox equipped with a number of objects that serve as a pre-fabricated framework for presenting an experiment (or in our case, a simulation) to participants. This toolbox includes an “Image Display object” used to display pictures to the subject; an editing-space termed “InLine Object” used to insert user-written E-Basic code into the simulation; a “List object” used to organize independent variables (including dialogue text) and associated values and trigger keys within the experiment; a “Slide object” used to organize and present visual stimuli (e.g., text, images, graphics) and sound stimuli, or any such combinations, to the participant; a “Procedure object” used to organize a sequence of events that occur in a sequential order (unless otherwise specified, i.e., using an InLine object to ‘jump’ to a particular object farther along in the experiment); and a “Text Display object” used to organize and display text to the participant, all which were used within the development of the simulation. Other items also available in the Toolbox include an “Image Display object”, “Label object”, “Movie Display object”, “Package Call object”, “Feedback Display object”, “SoundIn object”, “Sound Out object”, and a “Wait object”, though they were not used in the development of the simulation<sup>2</sup>.

The following sections explore the methods used to develop the computer-based simulation in E-Prime.

---

<sup>2</sup> This can be found in E Studio Help.

## 2. Methods

This section describes the methodology used in the development of the HRV simulation, as well as testing procedures and results. The simulation was designed to last approximately 30 minutes, while presenting about 75 interaction sequences (of the total 140 created) from the HRV script.

### 2.1 Simulation development

#### 2.1.1 Phase 1

The scientific authority provided the research team with an edited version of the written HRV script originally developed by Tario et al. (2008). The revisions included some wording changes within the dialogues and scoring values associated with each dialogue. The values associated with UNMO dialogues ranged from -5 to +5. Those associated with Sgt values are +1 and -1.

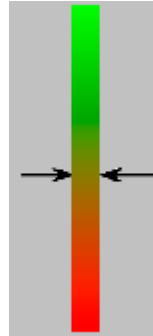
The scientific authority also provided a functional “starter version” of the HRV negotiation simulation in E-Prime containing placeholders for the edited version of the script. Items included in this version of the simulation were an experimental Procedure object used to organize the experiment; variable definitions using an InLine object; instructional information describing how to navigate through the negotiation using a Text Display object; introductory information about the scenario using Text Display objects; a decision point; a block that presents interaction sequences; and conclusions. The Decision Point (DP) included a Slide object which presented the decision choices and a Slide object that presented the choice selected and response. This DP also used several InLine objects and user-written E-Basic code that provided the simulation with instructions on which response to present based on the choice selected.

An interaction sequence block followed. An initial series of List objects and interaction sequence Slide objects presented the initiation dialogue and dialogue choices to the participant and subsequently presented the response dialogue. The List objects formatted to contain the HRV script included the stage, theme, all possible UNMO dialogue choices (2 or 4) and values associated with each UNMO dialogue, the number of UNMO dialogue choices (either 2 or 4), both Sgt dialogue possibilities (one positive, one negative), and allowable response key choices (e.g., key “1”, “2”). Note that the initial shell of the E-Prime program provided by the Scientific Authority provided a working version of the rough structure, but did not include all of HRV script interaction sequences. Incorporation of the HRV script was done by the contractors as will be described further on in this section. Like the decision point, several InLine objects were incorporated to provide the E-Prime simulation with instructions on which response to present based on the choice selected. One of the InLine objects was created to provide instruction on how to present feedback. The Slide object presenting the response incorporated two graphic mechanisms intended to provide the participant with feedback of their negotiation performance. One was an arrow graphic designed to show participants if the choice they just made had a positive or negative impact on the negotiation. As shown in Figure 1, the red arrow would indicate a negative impact and the green arrow would indicate a positive impact.



**Figure 1: Arrow graphic**

The other form of feedback was a meter-graphic designed to indicate the overall quality of the negotiation (positive or negative) on a relative scale (see Figure 1).



**Figure 2: Feedback from meter-graphic**

A conclusion Slide object was incorporated to provide feedback to the participant about their performance. This was done through the use of an InLine object that contained code to calculate the cumulative score of the negotiation, and present this score on the conclusion Slide. A final Text Display object told the participant the simulation had ended.

### **2.1.2 Phase 2**

The contracting team then further developed this initial version of the script. The objective was to generate a simulation that held the basic structure of the original script design. The key elements were to include scenario information, the four stages of a negotiation and associated themes (see Table 1) and interaction sequences, feedback mechanisms for training purposes, and to achieve a coherent progression through a negotiation. To this end, the simulation was developed beginning with instructions, an introduction, followed by a decision point, block 1, a second decision point, block 2, a third decision point, block 4, a fourth decision point, and conclusions. Table 2 presents the sequential structure of the simulation and provides a brief description of each component.



**Table 2: Overview of structure**

Simulation component	Description
Orientation and navigation instructions	These slides describe what feedback will be received and how to navigate through the interaction sequence slides.
Information about the scenario	These slides provide background information about the context in which the negotiation takes place.
Decision Point 1 (DP1)	Acts as a transition point into the negotiation. Participants are provided with key information required for the first part of the negotiation.
Block 1 - Preliminaries	The simulation is configured to present 8 interaction sequences randomly pulled from all 4 preliminary themes.
Decision Point 2 (DP2)	Provides key information regarding the next section. Note that this item is a transition point and does not actually provide a decision opportunity.
Block 2 - Situation Awareness and Relationship Building	The simulation is configured to randomly choose 40 interaction sequences from each of the 12 themes (four themes from SA, four themes from PRB, and four themes from NRB).
Decision Point 3 (DP3)	Presents additional key information needed to signal the imminent end of the negotiation. Note that this item is a transition point and does not actually provide a decision opportunity.
Block 3 - Negotiating Skills and Relationship Building	The simulation is configured to randomly choose 27 interaction sequences from 12 themes (four themes from NS, four themes from PRB, and four themes from NRB).
Decision Point 4 (DP4)	The Sgt leaves with the civilians and the participants are given a choice of what final action they would like to take.
Feedback slide	A feedback slide is then presented showing the participant's overall score during the negotiation.
End slide	Participants are then instructed to get the experimenter.

The contractors developed the rest of the E-Prime simulation using a systematic method to allow testing during development. When creating the E-Prime simulation, each E-Prime object (as described in section 1.3) is identified with an additional title. For example, a Slide object found in DP1 may be described as the Slide object: DP1.

The initial step in creating the simulation was to develop a “skeleton” simulation in which all simulation components were included, and all feedback mechanisms, procedures, and additional user-written coding was functioning appropriately. The dialogues from the HRV script were not included in this skeleton. Instead, place holders for the dialogue were created and populated with sequential identifying names and numbers that simplified trial testing. For example, interaction sequences were identified by the stage, theme, sequence number, associated value (i.e., P\_2\_IS3\_2 is the third interaction sequence (IS3) within the second theme of the P stage that has an associated score value of +2). Values were numbered 1 through 4 and associated with the corresponding UNMO choice (1 and 2, or 1 through 4 depending on the number of choices within the particular interaction sequence).

**Instructions** The initial instructions and introduction Text Display objects were changed to Slide objects which allowed the text to be formatted consistently with other Slide objects used in the simulation. Orientation and navigation instructions were developed to describe the appropriate keys to press on the keyboard, and presents definitions of feedback graphics used during the simulation. The instruction screens also provide participants the opportunity to familiarize themselves with the interface of the training session (e.g., font, background colour, response keys).

**Information** Information about the scenario was further developed and provided in four subsequent Slide objects. These slides inform participants about their role as UNMOs, their task, the current operational



climate, relevant historical events that have occurred in the region, and precipitating events leading up to the negotiation. The content provides details similar to that experienced in the PSTC training scenario. For example, the initial introduction slide reads, *“As you and your 2IC (second In Command) are walking down the road to meet the patrol from regional HQ (Headquarters), you suddenly hear a woman scream, “Leave me alone! Let me go!” About 100 meters ahead, you see an armed police officer dragging a woman across the road. When she sees you, she screams, “Help me! Please help me!”*

**Decision Point 1** Following the orientation and scenario information slides, the negotiation begins. The original DP1 was developed to include the appropriate DP1 text as defined in the HRV script. The choices presented to the participants using the Slide object: DP1 Choice Slides are:

- 1) Introduce self by saying: “We're with the UN and we're unarmed. I'm Major Smith and this is my Second In Command (2IC), Captain Jones”.
- 2) Assess the situation by saying: “What's going on here?”

When choice 1 is selected the Sgt’s response is positive and is presented in the Slide object: Response. When choice 2 is selected (which is the negative choice) the Sgt’s response that was displayed had a negative valence. All text, such as the UNMO and Sgt dialogue text, is contained in the List object: DP1 (the full text can also be seen in the revised HRV script in Annex A). The associated InLine object: DP1 Randomize provides the code that the Slide object: DP1 Choice Slide requires in order to present the text found in the List object: DP1. The code contained here also randomizes the presentation of the UNMO choices. For example, choice A, B, C, and D may be presented in the order 1, 2, 3, and 4 respectively in one run through of the simulation, where as in another run through of the simulation, they may be presented in the order 2, 1, 4, and 3. After DP1, the simulation then moves to the next component which is Block 1.

**Block 1** Block 1 was based on the interaction sequence block originally provided in the starter simulation. The contractors designed this block to present eight interaction sequences randomly chosen from the four different theme List objects. This block was designed to represent the Preliminary stage and its associated themes (see Table 1). List objects were added and designed to reflect the number of Preliminary interaction sequences. Values for each UNMO choice were numbered sequentially to correspond with the choice number (1 and 2 or 1 through 4).

Within Block 1, a Slide object: Initiate Slide was used to present the initiator’s dialogue and the UNMO choices. As stated above, interaction sequences are programmed to be randomly selected from the total list. When one is selected that contains an UNMO initiating the dialogue, only the UNMO dialogue choices were presented in the initiate Slide object. When the Sgt initiates the dialogue, both the Sgt dialogue and the UNMO response choices are presented.

Within the E-Prime program, Procedure object: Action Sequence contains all Slide objects (Initiate Slide, and Response Slide) and InLine objects (Randomize, Setup, and Response) for the initiate and response slides. As described previously, each interaction sequence contains a number of UNMO choices and a positive and negative Sgt dialogue. When the Sgt initiates a dialogue the valence is chosen based on the total cumulative score. If the total cumulative score is positive, the Sgt’s initiating dialogue is positive, likewise, if the total cumulative score is negative, the Sgt’s initiating dialogue is negative. The code to allow the E-Prime program to run this is contained within InLine object: Setup.

Associated InLine objects contains programming code that allows several things to happen. First, as is the case with all Slide objects, the InLine object provides the code that is required to populate the Slide object with text contained in the associated List objects, and graphics as required. In this case, the In Line object: Randomize contains the code that allows the Slide object: Initiate Slide select and present the appropriate information from the List object: P theme 1, List object: P theme 2, List object: P theme 3 or List object: P theme 4 (depending on the randomly selected interaction sequence). As well, it contains the code that presents the UNMO choices in random positions on the slide, similarly as described previously for DP1.

Also contained in the InLine object: Setup, is the programming code for the presentation of two sources of feedback. One is Sgt text font colour, and the second is the meter-graphic. First, as indicated by the scientific authority, colouring the Sgt dialogue would provide important feedback about the Sgt’s mood. It is expected

that if the overall quality of the negotiation is poor, the Sgt would also be in a poor mood. Likewise, if the overall quality of the negotiation is good, the Sgt's mood would be good. The InLine object: Setup thus contained code that would use the cumulative score to determine in the colour of the Sgt initiation dialogue that would be displayed. If the cumulative score was zero or a positive integer, the Sgt's initiating dialogue is presented in green font. If the cumulative score was a negative integer, the Sgt's initiating dialogue is presented in red font. Note that the colouring is only applied to the Sgt initiated dialogue in accordance with requirements identified by the scientific authority.

Second, the meter-graphic was designed to reflect the overall quality of the negotiation determined by the overall cumulative score. When the participant selects a choice from the initiate Slide object, the associated value is added to a total cumulative score. As the score moves up and down, the black arrows indicate the quality of the negotiation thus far (see Figure 2). The example in Figure 2 shows a negotiation that is neutral (neither excellent, nor poor).

The user-written code for selecting the appropriate meter-graphic proved to be complex and challenging. Based on initial ideas provided by the scientific authority, contractors developed a method of incorporating 30 different meter-graphic pictures into the simulation. This was done by creating 30 different score ranges and matching each one of the 30 graphic pictures to one of these ranges.

As a first step, using the valences associated with each of the available UNMO options (either 2 or 4) in each interaction sequence, contractors determined the minimum value over the course of 75 possible interactions and the maximum value over the course of 75 possible interactions. For example, calculating the maximum possible score that could be achieved required calculating the highest valences associated with interaction sequences from each stage while choosing the correct number of interaction sequences from each stage and theme as outlined in Table 1. The highest possible score that could be achieved is 244. A similar process was used to calculate the minimum scores, showing that -280 is the lowest possible score that participants could be obtain. The range implemented in the program covers -280 to +244 (and beyond, to ensure proper functioning).

This maximum range was divided into 30 smaller ranges, one for each of the meter-graphic pictures. The calculation was as follows:  $(280 + 244)/30 = 17.5$ , which means there must be 17-18 numbers included in each range. The meter-graphic ranges are required to be mutually exclusive. It was also expected that once participants are at an extreme end (either positive or negative), one graphic could affordably represent the quality of the overall negotiation. Each range does not include the upper and lower limit values. For example, the lowest range is set to numbers below (but not including) -260, the next range is set to numbers above (but not including) -261 and below (but not including) -242. In order to ensure that the number -242 itself is included within a range, the next range is set to numbers above -243 and below -224, and so on. Negative ranges (those below 0) were created adding intervals of 19. There was one mid-range set created as -9 to +9 has an interval of 18. Positive ranges were also created adding intervals of 18 (e.g., +8 < to > +26 followed by +25 < to > +43. Each range was then associated with a meter-graphic in the appropriate sequence; the lowest cumulative score range is matched with a meter-graphic showing black arrows at the bottom of the scale, the highest cumulative score range is matched with a meter-graphic showing black arrows at the top of the scale, and those in between are matched sequentially. The end result includes 14 meter-graphics in the positive range, one mid point meter-graphic, and 14 meter-graphics in the negative range. See Annex B for a full listing of the ranges. Once the 30 ranges (associated with the appropriate meter-graphic) were defined, they were incorporated into the script to provide feedback on the quality of the negotiation throughout the entire negotiation. The meter-graphic is presented on both the initiate slide and response slide which is discussed below.

The next step in following through the simulation is the presentation of the Slide object: Response Slide, which takes place after the participant selects a dialogue option from the Slide object: Initiate Slide. Several visual stimuli are presented on the Slide object: Response Slide. First, all the text seen on the initiate slide is preserved. Second, the participant's response is highlighted. Third, feedback about the choice selected is provided by arrow graphics. If the dialogue is UNMO initiated, the Sgt's response is presented. If the dialogue is Sgt initiated, the Sgt's dialogue is preserved as it was displayed on the initiate slide.

An associated InLine object: Response contains the information required for the program to appropriately present all elements within the response slide. E-Basic code was written to ensure that the selected choice is appropriately highlighted. The value of the selected choice is also noted and subsequently used to present two items, the arrow feedback and Sgt text (only if the interaction sequence is initiated by UNMO and thus requires a Sgt response). If the value of the selected choice is positive, the Sgt's response is positive. If the value is negative, the Sgt's response is negative. Likewise, if the value is positive, a green arrow pointing up (see Figure 1) is presented. If the value is negative, a red arrow pointing down is presented. These arrows are presented only on the response slide.

For each of the eight randomly chosen Preliminary interaction sequences within Block 1, the Action Sequence procedures are executed. The Action Sequence procedures then end and the simulation runs the subsequent component, in this case, DP2.

**Decision Point 2** DP2 follows and provides information required to all participants. Note that this point does not actually require a decision, but rather provides standard, requisite information. For example, there may be dialogue in the upcoming blocks regarding the death of the Sgt's brother. Thus, DP2 states *"I have the badges and documents that we found on the civilians proving they're PLA. Terrorists killed my brother!"* The information is presented on a Slide object: DP2. The InLine object: DP2 Randomize provides programming instructions of how to populate the Slide object: DP2 Information Slide using the text listed in the List object: DP2.

As identified in the script development, RB was found to occur throughout the negotiation, predominantly in combination with SA and NS. To ensure these stages and themes were presented together, the RB interaction sequences were divided between both SA and NS stages. The total number of RB interaction sequences (39) were divided between Block 2 and Block 3. It was ensured that interaction sequences from all eight themes (4 PRB and 4 NRB) within RB were divided between both blocks.

**Block 2** Block 2 was designed to randomly present 40 interaction sequences reflecting a combination of SA and RB. The skeleton simulation was designed to reflect the full inventory of interaction sequences for the RB and SA stages that would be later incorporated. This list contained 19 interaction identifiers for RB interaction sequences and 54 identifiers for SA interaction sequences. These numbers accurately represent the required proportions of each negotiation stage as identified in previous work (see Table 1). Thus, it was expected that random selection from this inventory would present the appropriate proportions of each stage.

The Procedure object: Action Sequence identical to that run in Block 1 was then added to Block 2. This contains a Slide object: Initiate Slide that presents the interaction sequences, and meter-graphic as instructed by the InLine object: Setup and a Slide object: Response Slide that presents all response and feedback elements, also as instructed by the InLine object: Response.

**Decision Point 3** Similar to DP2, DP3 provides participants with requisite information that expands understanding of the situation. This point, again, does not require an actual decision to be made, but presents information about the scenario. DP3 states, *"We have to be leaving soon to get these prisoners to the police station."* This statement ensures that participants are aware that the negotiation will be coming to a close soon. Again, an associated InLine object: DP3 provides the E-Basic code required to populate the Slide object: DP3 with the text in the List object: DP3.

**Block 3** Following the third DP, Block 3 was designed to randomly present 27 interaction sequences reflecting the number of interaction sequences of the combined stages NS and RB. Following a similar strategy as used in Block 2, List objects (see Table 3) were created to compile an inventory of the NS and RB interaction sequences that accurately represents the number of interaction sequences in those stages. There are 32 and 20 interaction sequences for NS and RB respectively. Again, it was expected that random selection from this inventory would present appropriate proportions of each stage. The Procedure object: Action Sequence was again added to ensure the presentation of interaction sequences and feedback graphics.

**Decision Point 4** The presentation of 27 randomly selected interaction sequences from Block 3 is followed by DP4. This is a point at which the negotiation comes to a close. A Slide object: DP4 presents Sgt text

saying that the Sgt is preparing to move out of the area with the civilians. A second Slide object: DP4 Choice Slide is then presented that requires the participants to make a decision. Three choices are presented;

- 1) Do as the Sgt requested and begin walking down the road toward the police station;
- 2) Stay in position and watch where the police take the civilians; or
- 3) Follow the police and civilians into the woods.

The InLine object: DP4 Randomize provides the code required by the Slide object: DP4 Choice Slide to present the text contained in List object: DP4. After making a selection, participants are presented with the Slide object: DP4 Response. This response slide is similar to those within the Action Sequence procedure in that it presents all information contained in the DP4 Choice Slide and highlights the selected option. This selected option determines what the outcome will be as it is presented in the Slide object: DP4 Outcome Slide. If participants choose to leave the area or watch the civilians and the police go into the bush, participants are presented with, *“You hear a gunshot. The civilians have been shot.”* If participants follow the police into the bush with the civilians they will see, *“Congratulations! The civilians will live because you followed them into the woods.”* As the negotiation comes to a close, two final slides are presented.

**Feedback** As described earlier, a cumulative score is calculated throughout the negotiation. During the negotiation, the cumulative score is used to determine the meter-graphic feedback. At the end of the negotiation, the cumulative score is presented as an overall score. The Slide object: Total Score Slide presents the raw cumulative score as an overall evaluation of the negotiation. The calculation and presentation of this score is programmed in the InLine object: TotalScore.

**End** A final Slide object: End of Experiment concludes the simulation and instructs the participant to notify the experimenter.

A summary of the E-Prime structure including all objects is presented in Table 3.

**Table 3: E-Prime simulation structure of the HRV negotiation**

Simulation component	Associated E-Prime Object
Orientation and navigation instructions	Slide object: Instructions1 Slide object: Instructions2
Information about the scenario	Slide object: Introduction 1 Slide object: Introduction 2 Slide object: Introduction 3 Slide object: Introduction 4
DP1	List object: DP1 Procedure object: Decision containing: <ul style="list-style-type: none"> <li>- InLine object: DP1 Randomize</li> <li>- Slide object: DP1 Choice Slide</li> <li>- InLine object: DP1 Response</li> <li>- Slide object: DP1 Response Slide</li> </ul>
Block 1 - Preliminaries	List object: P List object: P theme 1 List object: P theme 2 List object: P theme 3 List object: P theme 4 Procedure object: Action Sequence containing: <ul style="list-style-type: none"> <li>- InLine object: Randomize</li> <li>- InLine object: Setup</li> <li>- Slide object: Initiate Slide</li> <li>- InLine object: Response</li> <li>- Slide object: Response Slide</li> </ul>
DP2	List object: DP2 Procedure object: Decision 2 containing: <ul style="list-style-type: none"> <li>- InLine object: DP2 Randomize</li> <li>- Slide object: DP2 Information Slide</li> </ul>
Block 2 - Situation Awareness and Relationship Building	List object: SA List object: SA theme 1 List object: SA theme 2 List object: SA theme 3 List object: SA theme 4 List object: PRB theme 1 List object: PRB theme 2 List object: PRB theme 3 List object: PRB theme 4 List object: NRB theme 1 List object: NRB theme 2 List object: NRB theme 3 List object: NRB theme 4 Procedure object: Action Sequence (see Block 1 for contents)
DP3	List object: DP3 Procedure object: DP3 containing <ul style="list-style-type: none"> <li>- InLine object: DP3 Randomize</li> <li>- Slide object: DP3 Information Slide</li> </ul>

Simulation component	Associated E-Prime Object
Block 3 - Negotiating Skills and Relationship Building	List object: NS List object: NS theme 1 List object: NS theme 2 List object: NS theme 3 List object: NS theme 4 List object: PRB theme 1 List object: PRB theme 2 List object: PRB theme 3 List object: PRB theme 4 List object: NRB theme 1 List object: NRB theme 2 List object: NRB theme 3 List object: NRB theme 4 Procedure object: Action Sequence (see Block 1 for contents)
DP4	Slide object: DP4 information List object: DP4 Procedure object: DP4 containing - Inline object: DP4 Randomize - Slide object: DP4 Choice Slide - Inline object: DP4 Response - Slide object: DP4 Response Slide - Slide object: DP4 Outcome Slide
Feedback slide	InLine object: Total Score Slide object: Total Score Slide
End slide	Slide object: End of Experiment

After each component of the simulation was added, the E-Prime program was tested to ensure it ran as expected. Upon completion of the E-Prime skeleton, further testing was conducted to ensure randomization, score calculations, and feedback mechanisms functioned as expected. This testing is further described in the following section.

## 2.2 Testing the simulation

Several elements of the simulation needed to be tested thoroughly to ensure they worked as expected. These included the randomization sequences, the scoring procedures, and the feedback sources.

The coded script was used for all testing throughout the development of the simulation. This script provided a traceable thread of each component within the simulation (e.g., P\_2\_IS3\_2). Contractors worked through the simulation systematically ensuring that all randomization and user-written code functioned as expected.

### 2.2.1 Randomization

Several processes were used to test whether the simulation was working as expected. This was important because the simulation was created to rely on randomization, rather than on strict “pulling” of a specific number of sequences.

Using the completed skeleton simulation, contractors ran through the simulation eight times and then analyzed the data output files for these eight trials. One critical issue to be explored was whether the randomization routine was working as expected. If so, one would expect a varying number of occurrences of each of the 75 interaction sequences, theoretically ranging between 0 and 8. Results of this analysis showed that 139 of the 140 interaction sequences occurred at least once during each of the 8 trials, with the most frequent sequences occurring 7 times. Annex C shows the actual frequencies.



It was also important to explore whether the required proportions were achieved for the different stages of the negotiation, as well as for the relative distribution of initiations by UNMOs versus the Sgt. The ideal versus the observed proportions are shown in Table 4.

**Table 4: Ideal vs. observed frequencies over 8 trials**

		UNMO		Sgt		Total	
		Ideal	Observed	Ideal	Observed	Ideal	Observed
Preliminaries	Engaging/ establishing relationship	8%	7%	3%	3%	11%	10%
Situation Assessment	Establishing situational awareness	27%	28%	12%	11%	39%	39%
Relationship Building	Building a positive or negative relationship	21%	19%	8%	9%	29%	28%
Negotiating Skills	Diffusing situation Search for alternatives Initiate civilian contact	16%	14%	5%	8%	21%	22%
<b>Total</b>		<b>72%</b>	<b>68%</b>	<b>28%</b>	<b>32%</b>	<b>100%</b>	<b>100%</b>

Within each stage observed proportions match the ideal proportions very well. Looking at the initiator (UNMO or Sgt) about 4% divergence was calculated with observed initiations by the Sgt being slightly higher than the ideal.

### 2.2.2 Feedback

As stated previously, three types of feedback were incorporated into the simulation: the arrow graphic, the meter-graphic, and font colour of Sgt initiated dialogue. Testing was conducted to ensure that each source accurately and reliably indicated feedback as was intended.

It was found that the arrow graphic did accurately reflect the response value valence of the dialogue chosen. Feedback for the meter-graphic was tested after the complete set of 30 meter-graphics and appropriate ranges were defined. The cumulative score, ranges, and corresponding meter-graphic were tested for agreement, accuracy, and reliability. The simulation was run through extensively. Every value between -281 through +245 was tested and the correct corresponding meter-graphic was confirmed. In order to systematically conduct this testing, each meter-graphic was modified so that it could be identified with a small number in the bottom corner. This number indicating which graphic was being presented on the screen and could then be traced back to its defining range and matched to the cumulative score. During this testing, the cumulative score was also tested thoroughly and it was confirmed that the program did calculate the cumulative score and present the total cumulative score as expected.

A final testing simulation was conducted using the actual HRV script. The arrow feedback, meter-graphic, font colour of Sgt initiated dialogues, and the total cumulative score were all confirmed to function as intended.

### 2.2.4 Proof of Concept

The research team ran a limited “proof of concept” session to explore the basic functioning of the simulation and to receive feedback about it. Five undergraduate recruits participated in these sessions. Participants were brought into a meeting room with five workstations set up with a laptop. Participants were asked to navigate

through one full session of the HRV negotiation simulation and then fill out a questionnaire. They were encouraged to ask the experimenter questions at any time.

Participants completed the study on the laptop with an average time of 24 minutes. After completion, participants were asked to fill out the questionnaire (see Annex D). The questionnaire allowed participants the opportunity to provide feedback on the instructions, interface, the conversation, the dialogue, available options, interest level, and the overall experience of the negotiation. There was also an open ended section that asked for recommendations.

The overall questionnaire feedback was positive for all aspects of the simulation including the interface, text content, organization, and flow. Participants reported that the interface was clear and easy to read. Four of the five participants strongly agreed or agreed that the size, colour, and type of font was clear and legible. The positioning and form of the graphics were also reported to be aesthetically pleasing.

All five participants strongly agreed or agreed that the instructions and scenario development were clear and easy to understand. All five participants also reported being able to understand the scenario as the negotiation progressed. Participants generally agreed that the flow and comprehension of the conversation was good. In addition, all five participants strongly agreed, or agreed that the dialogue presented in the options usually represented what they would have liked to say in a real situation. Likewise, all participants agreed that the HRV simulation was very engaging and interesting.

However, several comments pointed to the fact that the Sgt's dialogue seems repetitive and curt. Participants suggested changing the Sgt's dialogues to be more informative. In the actual training scenario, however, the actors who played the Sergeant were instructed to offer very little information, and to generally initiate dialogue directed at getting trainees to leave. Hence, although the comments of participants were noted, the Sgt's dialogues are representative of those in the actual training scenario.

Observations from the data show that participants did not always choose the most optimal responses, i.e., the option with the highest value. This provides evidence that the script content was adequately designed for training, in that it implies it may be more difficult to distinguish ideal options from sub-optimal options. It is proposed that participants with negotiation training may pick up on the nuances and be able to better navigate through this simulation relative to undergraduate students with no negotiation training. Comparing results of these trials to the real negotiation simulation results at the PSTC may be interesting future work.

This informal proof of concept confirmed there was a high level of interface clarity, ease of navigation, and content coherence. The presentation of the simulation was clear and legible. Navigating through the negotiation using E-Prime software was relatively easy and straight forward. The content was engaging and the feedback provided was appropriate. The simulation was reported as being engaging and interesting. An accurate representation of a HRV negotiation was successfully developed. All components of the simulation program functioned as intended.

## 2.3 Summary of the simulation

The completed simulation begins with orientation and instructions about the simulation. It includes introductory information about the HRV scenario, derived originally from a HRV training scenario used at the PSTC. The completed simulation incorporates the previously developed HRV script that includes four decision points, and 140 interaction sequences that progress naturally and realistically through 4 stages of a negotiation. The simulation was designed to provide feedback throughout the negotiation. The meter-graphic and Sgt font colour provide feedback of the overall quality of the negotiation, and the arrow graphic indicates if a chosen response positively or negatively impacts the negotiation. Finally, the total cumulative score provides an overall evaluation of the completed interaction. With the E-Prime skeleton complete, the interaction sequences, and associated values from the HRV script were then incorporated to produce a final version of the simulation. This master version was tested several times by the contractors to ensure the program ran as expected with the new data incorporated.



### 3. Conclusions, Limitations and Future Improvements

This report describes the development of a computer based Human Rights Violation negotiation simulation employing a script and using an E-Prime platform. The content of the simulation is an empirically based script initially developed by Tario, Karthaus, Adams and Thomson (2008). The HRV script was founded on PSTC training scenarios.

The script includes a number of components such as introductions, decision points, interaction sequences, feedback mechanisms, and concluding slides that were implemented within the computer simulation. Throughout the negotiation, participants are provided with multiple sources of feedback that allow them to monitor their own progress and understand the desirability of choices they make. The simulation concludes by providing participants with the final outcome as to whether the civilians are saved or killed, and a total score of the success of their negotiation. The pilot study conducted confirmed a high level of interface clarity and ease of navigation. The simulation was tested and confirmed to be coherent and engaging.

However, there are limitations within the simulation. For example, the meter-graphic was designed to present a visual indication of the overall quality of the negotiation. Due to the large range within each of the 30 ranges within the design, the meter-graphic presented does not change until the cumulative score tallies to a value outside that graphic's range. This means that participants are not given feedback about small changes in the overall quality of the negotiation. A second limitation is that the total cumulative score presented at the end of the simulation is not associated with constructive criticism. The value may be received as arbitrary and future development of the simulation should ensure that participants leave the simulation having a good sense of their performance.

The HRV simulation generated in this work provides a platform for future training and experimentation that, as a laboratory-based tool, provides a method for easy manipulation and repeated-measures studies. The HRV simulation developed in this work should be appropriately validated by Subject Matter Experts (SMEs) prior to being used as a training and/or experimental platform.

Further development of the HRV negotiation simulation may enhance the realism of the experience. There are a number of improvement possibilities that may contribute significantly to the fidelity and training based feedback. The following is a list of these prospects:

- Incorporating training text feedback may provide general suggestions at particular points in the simulation or could be incorporated as training feedback to encourage participants to choose less negative responses and more positive responses (e.g., "*You are starting to upset the Sgt. Remember that he is in charge and you are attempting to get information from him*"). One option may be to present training points after one, three, or five negative responses in a row.
- Incorporating sound may increase the realism of the experience. For example, integrating screams of the civilians intermittently during the simulation, or hearing the Sgt's tone of voice when he is getting particularly angry. A response may be intended to have a certain tone (e.g., sarcastic, positive, angry), but may not come across as such through the wording of the interaction sequence.
- Incorporating video footage may also increase the realism of the experience. Video showing the treatment of the civilians can enhance the urgency of the situation.
- Incorporating pictures may also increase the realism of the experience. Similar to the video suggestion, pictures may be an easier format to increase realism of the negotiation.
- Incorporating more detailed scoring methods. It may be beneficial to capture participant's performance at each stage of the negotiation and record scores for each theme. This may be useful in identifying which areas of the negotiation require the most improvement, and in which areas the participant excelled.

- Incorporating text feedback at the end of the simulation may provide more instruction on how to improve negotiation skills in the future. For example, if the negotiation went very poorly the feedback may read: *“You did very poorly. If this were a real negotiation, you most likely endangered yourself, your team, and possibly the civilians. It is important to remember that the Sgt is in charge and it is your job to retrieve as much information from him as possible. This includes asking the Sgt open ended questions, while building a positive relationship with him. It is also critical to ensure the situation does not escalate, and in the end, all parties involved are alive and uninjured (including your team and the civilians).”*
- Incorporating audio recording of the Sgt and UNMO response texts. Hearing the tone of voice used for each response option would provide trainees with additional context for interpreting the mood of the Sgt, and additional information about the possible implication of choosing a specific option (e.g., the Sgt might get even more angry).

Future work that focuses on these changes may enhance the realism of the negotiation in the form of visual and auditory cues, namely sound, video, and/or pictures. Further testing is recommended to investigate how additional visual and auditory cues impact the negotiation task. Feedback may also be presented through these means i.e., tone of voice (sarcastic tone). Supplementary feedback focusing on specific behaviours and/or themes may be beneficial to training.

## References

Psychology Software Tools Inc. 2009. E Prime 2. Retrieved on November 26, 2009 from <http://www.pstnet.com/eprime.cfm>

TARIO, C.D., KARTHAUS, C.L., ADAMS, B.D., THOMSON, M.H. 2008. Formalized script development of a realistic negotiation for computer-based simulation. DRDC T No. CR2008-106. Toronto, ON: Defence Research and Development Canada.

THOMSON, M.H, ADAMS, B.D. 2007. Moral and ethical decision-making in a realistic field training scenario. DRDC T No. CR2007-012 Toronto, ON: Defence Research and Development Canada.

THOMSON, M.H., ADAMS, B.D., TARIO, C.D., BROWN, A.L. 2008. Collaborative team decision-making in a realistic CF training scenario. DRDC T No. CR2008-098. Toronto, ON: Defence Research and Development Canada.

THOMSON, M.H., ADAMS, B.D., WALDHERR, S.U. 2007. The impact of emotion on negotiation behaviour during a realistic training scenario. DRDC T No. CR2007-166. Toronto, ON: Defence Research and Development Canada.

THOMSON, M. H., ADAMS, B.D. 2008. CF subject matter expert negotiation coding validation. DRDC T No. CR2007-021. Toronto, ON: Defence Research and Development Canada.

## **Annex A.**

The revised HRV script that is incorporated into the simulation is provided in an accompanying Excel document.

## Annex B.

**Table 5: Ranges for meter-graphic**

Lower range	Upper range
	< 260
> -261	< -242
> - 243	< -224
> - 225	< - 206
> - 207	< - 188
> - 189	< - 170
> - 171	< - 152
> -153	< -134
> - 135	< - 116
> -117	< - 98
> -99	< - 80
> -81	

## Annex C.

**Table 6: Interaction sequence frequency**

Theme	Dialogue	Interaction Sequence	Frequency (N=8)
<b>Preliminaries</b>			
Theme 1 - Introductions	Can I ask your name, Sir?	1	2
	May I introduce myself to your Constable?	2	6
	I'm from Canada. My teammates are too.	3	5
	Can I see your ID? This is my UN ID.	4	3
Theme 2 - Explain General Purpose	Actually, we're out patrolling the area, but we really want to help you.	5	4
	The UN has sent us here to investigate possible human rights violations. We are trying to keep peace in your country.	6	3
	Looks like you guys are having some trouble today. Is there anything we can do to help?	7	4
	To clarify our position better for you, we've been helping to encourage peace between Westland and Eastland.	8	5
Theme 3 - Establish Common Ground	I understand you're following orders. I have orders from my boss too.	9	5
	It can get hot like this in Canada.	10	6
	So you're police? Our police have the same colour uniforms.	11	3
Theme 4 - Create Social Event	Would you like to try some Canadian gum?	12	7
	Cigarettes in this country are good. They're different from ours. Would you like to try a Canadian cigarette?	13	3
	I've heard it's hunting season. What type of animals do they hunt around here?	14	5
	I know, it's supposed to be 30 degrees. (Passes water).	15	3
<b>Situation Assessment</b>			
Theme 1 - Specific Situational Information	We're here to ask you a few questions about what is going on.	16	5
	We'll report it to our HQ. But we want everyone to keep calm. We're trying to understand your position here.	17	3
	Why are those crosses there?	18	4
	Why are the civilians digging holes?	19	7
	Are there land mines around here?	20	4
	So what exactly are you ordered to do?	21	3
	What exactly is your Constable doing over there?	22	1
	Those people you are interrogating look exhausted. How long have you been here doing this?	23	2
	Do you have a radio on you?	24	2
	Did your superiors send you to this location?	25	5
	Can we go over and see the holes they're digging?	26	6
Theme 2 - Civilian Infraction	Oh, these don't look like the PLA badges I have seen before.	27	6
	We're sorry, we are just doing our job to investigate this area and those people are saying they're farmers.	28	5
	Could you tell me again, what is the evidence proving these people are terrorists?	29	5
	Can we have the prisoner's names for our notes?	30	4
	Have the prisoners been to court yet?	31	6

Theme	Dialogue	Interaction Sequence	Frequency (N=8)
	Where were the documents you found?	32	4
	Where exactly did you say the badges were found?	33	4
	These prisoners may not even be with the PLA.	34	5
	If they're terrorists, why are they saying they're farmers?	35	3
	Were these two people involved in your brother's death?	36	4
	What do you think the prisoners are holding back?	37	3
	Are these people currently under arrest?	38	2
	Okay, as long as you think he's not being too rough. This is your task.	39	4
	It's not a bad idea to get prisoners to do work.	40	5
	How did these people get involved with each other?	41	4
	It would really help us out if we could go over there and ask the prisoners their names for our report and where they're from. Would it be possible if one of my teammates goes to talk to them while we continue to talk?	42	5
Theme 3 – Determine Authority Structure	Before we go, we'd like to ask you some questions.	43	6
	We don't want to upset anyone, we just need some information.	44	6
	Maybe we can talk to your boss and resolve this whole thing. What's his name?	45	7
	Can we stop this and all go together to see your boss?	46	5
	So what I want to do is arrange for a liaison officer to meet with your boss.	47	5
	Are you the boss of this area?	48	4
	Are you holding these people on orders from your boss?	49	3
	Who does your boss report to?	50	1
	How many officers are at your HQ?	51	2
	How do we know you're really with the police?	52	3
Theme 4 - General Information	I think we actually patrol the same area as you guys. The north corner of Westland.	53	2
	I've been with the UN for a few months, but my colleagues have been with the UN for a while.	54	3
	It can get cold there in winter and hot in summer.	55	6
	We're one of three patrol groups in this area.	56	4
	I'm sorry that your brother was killed, that's terrible. I lost a brother when I was young too. What happened?	57	6
	Can you tell me a bit about where you live?	58	4
	Can you tell me a time when you've had a terrorist attack on yourself?	59	5
	I know a little about the PLA, but can you tell me more?	60	5
	Can you tell me about the terrorist activity in this area?	61	5
	How many guys are on patrol in this area?	62	4
	We're patrolling around on foot here. What mode of transportation are you using?	63	7
	Who is the Mayor of your city?	64	5
	I haven't been patrolling this area as long as you, Sir.	65	3
	I came a few months ago, but my partner has been here for almost a year.	66	3
	How many prisoners do you have down at your station?	67	5
	Can I get a phone number to reach your station?	68	5
The police use necessary force.	69	5	

Theme	Dialogue	Interaction Sequence	Frequency (N=8)
<b>Positive Relationship Building</b>			
Theme 1 - Empathy/ Responsive to Sgt	I understand what your saying and that's not fair. I'd like to investigate this further.	70	5
	As peacekeepers in this area, we just want to make sure everyone is happy in the end.	71	2
	We'd like to help you out.	72	3
	I understand your position. Having to interrogate prisoners seems like it could be difficult.	73	5
	Give us an opportunity to show how you can trust us.	74	4
	I'm very sorry your brother died. Losing a loved one is very hard.	75	3
	Does your village need supplies? Maybe we can help with that.	76	4
Theme 2 - Ask Permission	Can we take pictures?	77	5
	Can we write your name down because there's a lot of information to remember?	78	7
	Can we take notes?	79	5
	Okay, no problem.	80	6
	Can I walk over there?	81	4
Theme 3 - Compliment the Sgt	It seems like you're doing a great job. We just want to let you know we're not trying to take over.	82	4
	You have a well planned policing system over here.	83	3
Theme 4 - Assess Sgt's Beliefs, Values, Interests	You mentioned you had a brother; do you have any other siblings?	84	4
	It's very different here in this country. Is there anything we could do to make the situation better for you and your community?	85	6
	If you're interested, we could arrange a meeting and get your feedback on the UN. But we should do that after this situation is settled.	86	4
<b>Negative Relationship Building</b>			
Theme 1 - Express Critical Opinion	You probably can handle it differently than how you're handling it now if you really want to get information out of the prisoners.	87	7
	It seems your prisoners are tough to handle, how can we help?	88	3
	Can we share some of our investigation techniques with you?	89	5
	I am a Major, we may be able to help in places you can't.	90	5
	I realize we do things very differently than you may be used to.	91	3
	I've been briefed. I realize it can be tough out here.	92	5
	Look, your actions here are way out of line. We need to report this up the chain of command.	93	6
Theme 2 - Circumvent Authority	I know you think they're dangerous, but I'm unsure why.	94	0
	Get your boss. We want to talk to him now.	95	4
	May I talk to your Constable?	96	5
	Would we be able to speak with your boss?	97	4
Theme 3 - Make Demands	How would we get in touch with your superiors? Would you mind if I did that?	98	2
	We're not your boss, but I recommend you should still stop beating those prisoners.	99	3
	Those interrogation techniques go against the peace agreements your government signed. They may not be the ones you want to use.	100	6
	It looks like you're packing up to leave. You should wait until we call for back-up	101	4



Theme	Dialogue	Interaction Sequence	Frequency (N=8)
	As peacekeepers, we are here to ensure the peace agreements are followed. You should too.	102	5
	Could you spell the Constable's name? We'll have to write it down for our records.	103	4
Theme 4 - State Relevant Regulations	The cease fire agreement does actually apply to all military and police units. That would also include you.	104	6
	Can I tell you a bit about how I understand the cease fire agreement?	105	5
	Sorry if you have already heard of this, but do you know what the cease fire agreements are that your government has signed?	106	5
	Your prisoners look hurt. The Geneva Convention says you need to care for the wounded.	107	3
	The Geneva Convention states you can't treat people like this.	108	6
<b>Negotiating Skills</b>			
Theme 1 - Diffuse the Situation	Okay calm down, we can work everything out. Sorry, we didn't mean to upset you.	109	5
	We know you're in charge. We're unarmed. (Shows open unarmed hands)	110	3
	I'm very sorry. I understand that you're upset, but we're just trying to help here.	111	4
	Since we're unarmed, it would be nice for you to put down your weapon.	112	4
	It's ok, we're not a threat. We're just here to observe. (showing open hands)	113	5
	This can all be worked out calmly.	114	4
	Like you, we're following orders to investigate and settle potential issues we come across.	115	6
	I understand you're bothered, but we can work out a compromise.	116	4
	(jokingly say) He's an old guy, he's got stiff legs. He needs to keep them moving or he'll seize up.	117	5
	I can't hear because of the shouting. Maybe your Constable can stop yelling at the prisoners while we talk.	118	5
Theme 2 - Offer Suggestions	You're doing a fine job, but I'm unsure if intimidation is best for this situation.	119	4
	No, I just want to give you suggestions.	120	3
	We're just going to stay here, watch, and observe.	121	2
	Is there any other way to get them free? We would rather not leave.	122	6
	Instead of beating them, maybe you should talk to them.	123	3
	If you want to get going we can call for back-up and have a vehicle take us all to the station. It will be faster for all of us.	124	3
	Stop beating those people while I'm here, it makes me uncomfortable.	125	3
	If you're leaving, we're coming with you.	126	3
	We'd like to stay with the prisoners. I think the UN would also like to interrogate them for terrorist information.	127	3
	We can put them in jail for you.	128	4
	I'm sorry Sir, but we want to stay with your prisoners.	129	3
When the time comes, we'll decide what to do. But for now, I'd like to talk to you some more.	130	5	
Theme 3 - Empathy to Civilians	The lady seems very upset. Why is that?	131	5
	We have a first aid kit with us here. The lady looks cut. Can we offer her some first aid?	132	4
	Can I offer your prisoners some water?	133	7

Theme	Dialogue	Interaction Sequence	Frequency (N=8)
	I'm concerned about the prisoners over there. They seem to be really hurt.	134	4
	Do you really think this couple deserves this? They probably have families too.	135	6
	It's hot out today. Your prisoners must be getting tired. Maybe they'd dig faster if you gave them a few minutes break.	136	5
Theme 4 - Civilian Contact	We're coming with you if you leave.	137	3
	I would like to help you, and talk to your prisoners. May I do that?	138	3
	The prisoners are yelling to us. I'd like to reassure the prisoners, so they'll calm down.	139	6
	Your prisoners are shouting to us, may I respond?	140	4
		All Groups	598

## Annex D.

### Negotiation Training Session - Pilot Questionnaire

Please rate your experience with the negotiation training session below.

**1. The instructions at the start of the negotiation training session were clear and easy to understand.**

1	2	3	4	5
<i>Strongly Disagree</i>		<i>Neutral</i>		<i>Strongly Agree</i>

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**2. I understood what the scenario was about as I moved through the negotiation.**

1	2	3	4	5
<i>Strongly Disagree</i>		<i>Neutral</i>		<i>Strongly Agree</i>

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**3. The interface was difficult to navigate in some way (e.g., font was too small, hard to understand what was required of me).**

1	2	3	4	5
<i>Strongly Disagree</i>		<i>Neutral</i>		<i>Strongly Agree</i>

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**4. The conversation flowed smoothly and made sense.**

1	2	3	4	5
<i>Strongly Disagree</i>		<i>Neutral</i>		<i>Strongly Agree</i>

Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



# UNCLASSIFIED

<b>DOCUMENT CONTROL DATA</b> <small>(Security classification of the title, body of abstract and indexing annotation must be entered when the overall document is classified)</small>		
<b>1. ORIGINATOR</b> (The name and address of the organization preparing the document, Organizations for whom the document was prepared, e.g. Centre sponsoring a contractor's document, or tasking agency, are entered in section 8.)  Publishing: DRDC Toronto Performing: Humansystems® Incorporated, 111 Farquhar St., Guelph, ON, N1H 3N4 Monitoring: Contracting: DRDC Toronto		<b>2. SECURITY CLASSIFICATION</b> <small>(Overall security classification of the document including special warning terms if applicable.)</small>  <b>UNCLASSIFIED</b>
<b>3. TITLE</b> (The complete document title as indicated on the title page. Its classification is indicated by the appropriate abbreviation (S, C, R, or U) in parenthesis at the end of the title)  <b>Development of an E-Prime based computer simulation of an interactive Human Rights Violation negotiation script (U)</b> <b>Développement d'un programme de simulation par ordinateur fondé sur le logiciel E Prime pour la négociation interactive en cas de violation des droits de la personne (U)</b>		
<b>4. AUTHORS</b> (First name, middle initial and last name. If military, show rank, e.g. Maj. John E. Doe.)  <b>Courtney D. T. Hall; Cheryl L. F. Karthaus; Barbara D. Adams; Brian G. Mangan</b>		
<b>5. DATE OF PUBLICATION</b> <small>(Month and year of publication of document.)</small>  <b>June 2010</b>	<b>6a NO. OF PAGES</b> <small>(Total containing information, including Annexes, Appendices, etc.)</small>  <b>39</b>	<b>6b. NO. OF REFS</b> <small>(Total cited in document.)</small>  <b>6</b>
<b>7. DESCRIPTIVE NOTES</b> (The category of the document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of document, e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)  <b>Contract Report</b>		
<b>8. SPONSORING ACTIVITY</b> (The names of the department project office or laboratory sponsoring the research and development – include address.)  Sponsoring: Tasking:		
<b>9a. PROJECT OR GRANT NO.</b> (If appropriate, the applicable research and development project or grant under which the document was written. Please specify whether project or grant.)  <b>14de02</b>	<b>9b. CONTRACT NO.</b> (If appropriate, the applicable number under which the document was written.)  <b>W7711-088128/001/TOR callup 8128-04</b>	
<b>10a. ORIGINATOR'S DOCUMENT NUMBER</b> (The official document number by which the document is identified by the originating activity. This number must be unique to this document)  <b>DRDC Toronto CR 2010-055</b>	<b>10b. OTHER DOCUMENT NO(s).</b> (Any other numbers under which may be assigned this document either by the originator or by the sponsor.)	
<b>11. DOCUMENT AVAILABILITY</b> (Any limitations on the dissemination of the document, other than those imposed by security classification.)  <b>Unlimited distribution</b>		
<b>12. DOCUMENT ANNOUNCEMENT</b> (Any limitation to the bibliographic announcement of this document. This will normally correspond to the Document Availability (11). However, when further distribution (beyond the audience specified in (11) is possible, a wider announcement audience may be selected.)  <b>Unlimited announcement</b>		

UNCLASSIFIED

## UNCLASSIFIED

### DOCUMENT CONTROL DATA

(Security classification of the title, body of abstract and indexing annotation must be entered when the overall document is classified)

13. **ABSTRACT** (A brief and factual summary of the document. It may also appear elsewhere in the body of the document itself. It is highly desirable that the abstract of classified documents be unclassified. Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), (R), or (U). It is not necessary to include here abstracts in both official languages unless the text is bilingual.)

(U) This report describes the method of developing an E-Prime computer simulation of an interactive Human Rights Violation (HRV) negotiation. An HRV negotiation script was originally developed under the PWGSC Contract No. W7711-007893/001/TOR Callup No. 7893-12. The HRV negotiation script was designed based on a training scenario developed by the Canadian Forces (CF) for use at the Peace Support Training Centre (PSTC) at Canadian Forces Base (CFB) Kingston. The computer simulation developed in this project is intended to be used for future research and as a possible training platform for use at the PSTC.

(U) Le présent rapport décrit comment un programme de simulation par ordinateur fondé sur le logiciel E Prime a été développé pour la négociation interactive en cas de violation des droits de la personne (VDP). Un scénario de négociation pour les cas de VDP a été établi initialement en vertu d'un contrat de TPSGC : le contrat no W7711-007893/001/TOR, commande no 7893-12. Ce scénario de négociation était fondé sur un scénario d'instruction développé par les Forces canadiennes (FC) et destiné au Centre de formation pour le soutien de la paix (CFSP), à la Base des Forces canadiennes (BFC) Kingston. Le programme de simulation par ordinateur qui a été développé dans le cadre de ce projet est destiné aux futurs travaux de recherche, et il servira peut être d'outil de formation au CFSP.

14. **KEYWORDS, DESCRIPTORS or IDENTIFIERS** (Technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus, e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus identified. If it is not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

(U) Human Rights Violation; negotiation; Canadian Forces; computer simulation

UNCLASSIFIED