

The Applicability of Human Factors Engineering Analyses in Retail Stores - Appendices

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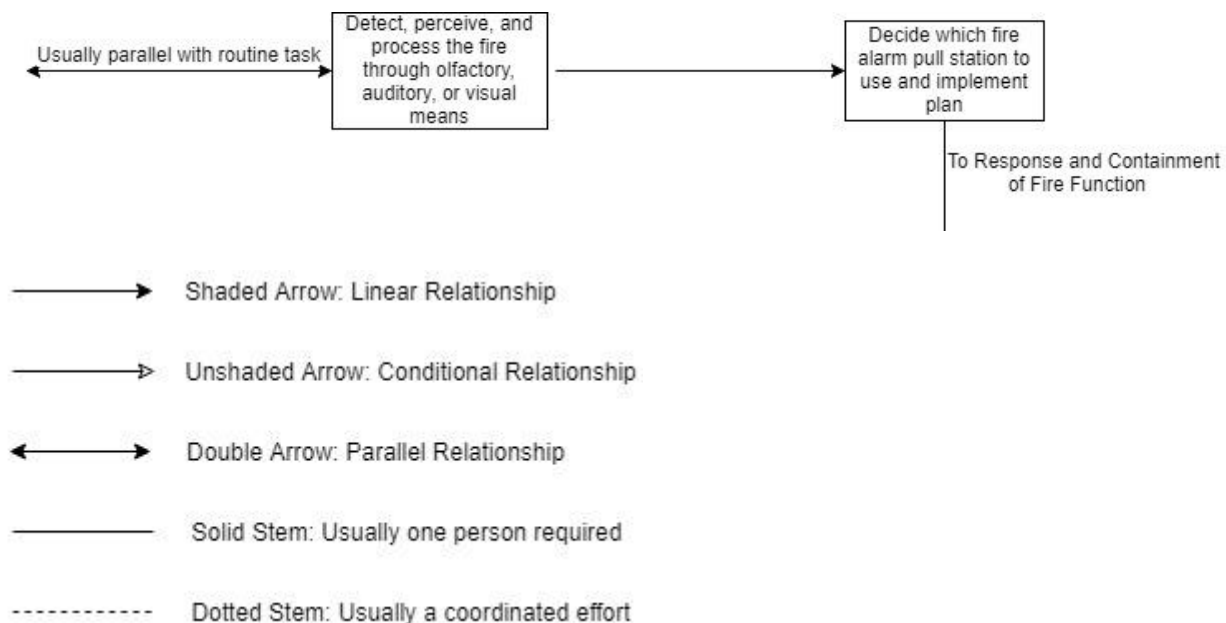
Appendix A: Safety Function - Detect Fire and Notify Others

This study performs functional requirement analysis (FRA), function allocation analysis (FA), and task analysis in a retail store. Seven high level functions, including four safety functions and three routine ones, were analyzed. Each appendix documents the detailed analysis for one function. The results in each appendix are presented in five sections which are ordered as follows:

1. the task diagram of the function
2. the results of the functional requirements analysis
3. the results of the function allocation
4. the results of the task analysis
5. the interview questionnaire including both the questions asked as well as the summarized interviewee responses

Appendix A is for the function “Detect Fire and Notify Others.” The results are presented in Sections A.1 to A.4. The questionnaire used for this function as well as for the function “Respond to and Contain Fire” is in Section B.5. The results for the other functions are presented in Appendices B-G.

Section A.1: Task Diagram for Function “Detect Fire and Notify Others”



The diagram above is the task diagram for the function “Detect Fire and Notify Others”. The diagram shows the tasks required to accomplish a function in the boxes with arrows indicating the relationships between the tasks. Five relationships are depicted with different types of arrows as indicated in the legend.

Section A.2: FRA for Function “Detect Fire and Notify Others”

The results of the FRA are documented in three tables. Table A-1 shows the available processes, systems, components, and human actions which are needed for the successful completion of the function. Table A-2 shows the purpose of the function as well as the conditions and parameters indicating the need and availability of the function. Table A-3 shows the parameters indicating the operation, success, and terminability of the function.

Table A-1: FRA - Processes, Systems, and Components/Human Actions for Function “Detect Fire and Notify Others”

Processes	Systems	Components/HAs
<ul style="list-style-type: none"> -People detecting the fire and notifying others -Fire response system notifying others of the fire 	<ul style="list-style-type: none"> -Volunteers and the manager who can detect the fire and notify others -Customers who can detect the fire and notify others -Fire alarm system 	<ul style="list-style-type: none"> -Visual, auditory, or olfactory acknowledgement of smoke/fire -Action of pulling the lever at a fire alarm pull station -2 fire alarm pull stations -4 flashing fire alarms -3 auditory fire alarms

Table A-2: FRA - Purpose and Conditions Indicating Need and Availability for Function “Detect Fire and Notify Others”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To ensure customer safety (safety function)	<ul style="list-style-type: none"> -One instance of a fire in the past -Relatively small store so fire poses larger risk -Volunteers and customers are generally elderly so greater precautions are needed 	<ul style="list-style-type: none"> -Fire alarm system is tested on a regular basis and the indicators fulfill the NFPA standards -Volunteers are aware of the locations of the fire alarm pull stations

Table A-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function “Detect Fire and Notify Others”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
-The pull station	-A volunteer or customer is	-The fire alarm station is tested

<p>automatically triggers the auditory and visual fire alarms</p> <p>-Volunteers and customers are able to hear and see the indicators from any location in the store</p>	<p>able to detect a fire</p> <p>-The volunteer or customer is able to pull the lever at the fire pull station and activate the fire alarm system</p> <p>-The other volunteers and customers in the store react to and understand the meaning of the fire alarm system's activation</p>	<p>so that when the pull lever is lowered to its initial position, the fire alarms shut off</p> <p>-A volunteer or customer misidentifies a fire or lies about a fire</p> <p>-The auditory and visual indicators continue operating well after the fire has been put out</p>
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Section A.3: FA for Function “Detect Fire and Notify Others”

The results of the function allocation are documented in one table. Table A-4 shows the current function allocation and the optimal function allocation.

Table A-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Detect Fire and Notify Others”

Current allocation	Optimal allocation
<p><i>Shared operation:</i> Currently, inexperienced and experienced personnel are responsible for detecting the fire and then manually activating the fire alarm system by pulling the lever at a pull station. Then, the notification of the fire occurs automatically as the visual and auditory fire alarms function. Personnel will be able to detect any degradation or failure of the fire alarm system based on whether they can see or hear the indicators.</p>	<p><i>Fully automatic control:</i> This entire process should be that human errors can be avoided. One of these is failure to detect the fire, which can be caused by multiple PIFs including physical impediments, and stress. Another human error avoided is failure to activate the fire alarm system via the pull lever. This error can be caused by a lack of situational awareness, failure to identify the pull stations, or by multiple PIFs. If smoke detectors are used and are linked to the fire alarm system, these human errors can be avoided.</p>

Section A.4: Task Analysis for Function “Detect Fire and Notify Others”

The results of the task analysis are documented in five tables. Each table decomposes the tasks into different components, which are shown in the table headers.

Table A-5: Task Analysis - Human Actions and Tasks for Function “Detect Fire and Notify Others”

Human Actions	Tasks
<p>-Acknowledgement of smoke/fire</p> <p>-pulling the lever at a fire alarm pull station</p>	<p>Task 1 - Detect, perceive, and process the fire through olfactory, auditory, or visual means</p> <p>Task 2 - Decide which fire alarm pull station to use and implement plan</p>

Table A-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function “Detect Fire and Notify Others”

Task	Decision-making	Response	Teamwork/Communication
Detect, perceive, and process the fire through olfactory, auditory, or visual means	<ul style="list-style-type: none"> -Absolute (Either occurs or does not) -The personnel member either detects, perceives, and processes the fire or does not 	<ul style="list-style-type: none"> -Turn towards fire -Detect and perceive the fire -Very infrequent task; requires high reliability. Customers may also accomplish this task but they are not as reliable as store personnel. -Time critical task in which the time needed varies with the size/location of fire -standing or sitting -no biomechanics required other than turning to face the fire 	-No teamwork/communication required
Decide which fire alarm pull station to use and implement plan	<ul style="list-style-type: none"> -Relative (Depends on situation and requires more thought) -The personnel member must evaluate the pull stations and make a choice. 	<ul style="list-style-type: none"> - Judge the pros and cons of each pull station -Pull the lever at the pull station -Very infrequent task; requires enough accuracy so that at least one lever is activated by either a personnel member or customer -Time critical task where the lever should be pulled before the fire puts people in danger -To pull the lever, the person should be standing -The person needs to pull down on the lever with only a small amount of torque 	-No teamwork/communication required unless someone cannot access a pull station due to fire or heavy merchandise

Table A-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function "Detect Fire and Notify Others"

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Detect, perceive, and process the fire through olfactory, auditory, or visual means	N/A	-There is no established workplace or worksite for this task	<ul style="list-style-type: none"> -Reduced staffing would hinder this task (with only a few personnel, the fire may not be detected quickly) -The personnel may not be able to detect the fire if they are distracted by customers in a different part of the 	<ul style="list-style-type: none"> -High potential for personal injury -Fire and smoke can cause burns and smoke inhalation -Falling debris is also a hazard

			store	
Decide which fire alarm pull station to use and implement plan	-A written fire response plan is in the back of the store -Fire alarm pull stations are used during this task	-Both pull stations are along the two escape routes -The pull stations are both near doors which could be heavily trafficked and noisy	-Panic (caused by time pressure) and stress could hinder this task (cloud decision-making) -The fire and smoke may impede the implementation of the plan	-Medium potential for personal injury -Fire, smoke, and falling debris only pose a threat if they are close to the pull stations

Table A-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function "Detect Fire and Notify Others"

Task	Narrative of Activities	Applicability	Time Required
Detect, perceive, and process the fire through olfactory, auditory, or visual means	A volunteer, customer, or the manager must detect a fire inside of the store.	This task allows for a fire to be recognized in the first place	5 minutes (the fire could be in an area that is not usually frequented by personnel or customers)
Decide which fire alarm pull station to use and implement plan	The volunteer, customer or the manager must think about which pull station is closest and least dangerous to access due to the fire. Then, the person should move quickly to the chosen pull station and pulls down on the lever.	This task facilitates the evacuation of the store because it allows for the notification of a fire via the fire alarm system	30 seconds (The personnel may not be aware of the locations of the pull stations)

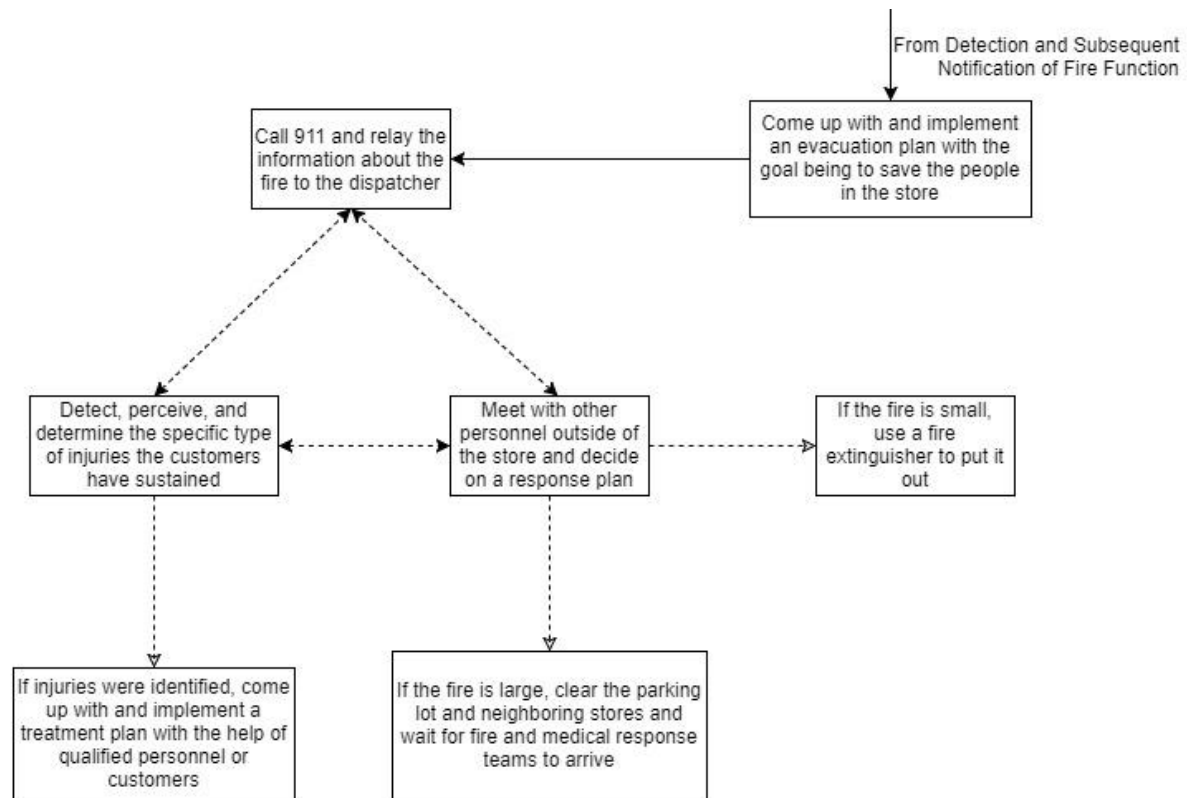
Table A-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Detect Fire and Notify Others"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Detect, perceive, and	-Cognitive: 1.4/5	At least 2	Ability to recognize a

process the fire through olfactory, auditory, or visual means	-Physical: Low -Overlap of task requirements: Usually parallel with a routine task		fire
Decide which fire alarm pull station to use and implement plan	-Cognitive: 3.6/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	Knowledge of the locations of the pull stations

Appendix B: Safety Function - Respond to and Contain Fire

Section B.1: Task Diagram for Function “Respond to and Contain Fire”



- Shaded Arrow: Linear Relationship
- Unshaded Arrow: Conditional Relationship
- ↔ Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- - - Dotted Stem: Usually a coordinated effort

Section B.2: FRA for Function “Respond to and Contain Fire”

Table B-1: FRA - Processes, Systems, and Components/Human Actions for Function “Respond to and Contain Fire”

Processes	Systems	Components/HAs
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<ul style="list-style-type: none"> -People responding to the fire -Fire escape plan (not well established) 	<ul style="list-style-type: none"> -Volunteers and the manager who can respond to the fire -Customers who can respond to the fire -Escape routes -Sweeping/Checking for remaining people -Fire safety equipment 	<ul style="list-style-type: none"> -help physically or mentally impaired people evacuate -Make sure escape routes are clear of debris -Meet outside and come up with plan of action -Simultaneously call 911 for both medical and fire response teams -Care for anyone who sustained injuries from the fire -2 escape routes which lead to doors -5 fire extinguishers -3 landline phones for calling 911 -1 First aid kit
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Table B-2: FRA - Purpose and Conditions Indicating Need and Availability for Function
“Respond to and Contain Fire”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To ensure customer safety (safety function)	<ul style="list-style-type: none"> -One instance of a fire in the past -Relatively small store so fire poses larger risk -Volunteers and customers are generally elderly so greater precautions are needed 	<ul style="list-style-type: none"> -There are at least 2 personnel present -The phones in the store are tested regularly and the batteries are replaced frequently -The fire extinguishers are monitored to ensure they contain enough chemical -The escape routes are kept clear of all merchandise

Table B-3: FRA Parameters Indicating Operation, Success, and Terminability for Function
“Respond to and Contain Fire”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
<ul style="list-style-type: none"> -Volunteers are able to help all customers evacuate before they evacuate -The fire extinguisher effectively puts out a small fire -Dialing 911 on the phones connects the volunteer with a dispatcher without a significant delay -The volunteers are able to meet in front of the store to 	<ul style="list-style-type: none"> -All of the volunteers and customers successfully evacuated the store following the activation of the fire alarm system. -If the fire was small enough, then was able to be extinguished with a fire extinguisher -911 was contacted with a phone, the situation was described, and fire teams and 	<ul style="list-style-type: none"> -The response teams can be notified if the fire was a false alarm -If the fire goes out on its own -If the extinguisher was able to put out the fire -No plan of action if the response teams arrive before one can be decided upon

<p>discuss and decide on a plan of action without panicking</p> <p>-The volunteers are able to execute the plan of action (One plan of action could be re-entering the store and attempting to put out the fire. Another could be clearing the parking lot so that fire trucks and ambulances can easily enter)</p>	<p>medical teams were sent</p> <p>-A plan of action was decided on and executed</p> <p>-Any customers or volunteers who sustained injuries received aid</p>	
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Section B.3: FA For Function “Respond to and Contain Fire”

Table B-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Respond to and Contain Fire”

Current allocation	Optimal allocation
<p><i>Manual Control:</i> Both inexperienced and experienced personnel are responsible for this high-level function. The personnel have to clear the store, put out the fire if it is small enough, call 911, come up with a plan of action, and then execute the plan of action.</p>	<p><i>Shared operation:</i> Some aspects of this function should be automated while others should be handled by human actions. The evacuation of the store should be conducted by humans because they would be able to give more detailed directions and the fire alarms should be enough to alert customers to exit the store. The task of quenching the fire should be automated in the form of fire extinguishers. The volunteers might not be able to put out a fire with the fire extinguishers because they might not know the locations of the fire extinguishers or how to operate them. Also, because there are many flammable items in the store such as clothing, furniture, and electronics, an immediate response with sprinklers (which would be triggered by the fire alarm system) would be ideal so that the fire does not spread. Next, the task of communicating with the local fire stations and hospitals should be allocated to experienced volunteers. A machine would not be able to give specific details about the magnitude of the fire and the damages/injuries incurred. Coming up with the plan of action and then executing the plan should be left to the experienced volunteers because humans are more able to respond to complex situations than machines are.</p>

Section B.4: Task Analysis for Function “Respond to and Contain Fire”

Table B-5: Task Analysis - Human Actions and Tasks for Function “Respond to and Contain Fire”

Human Actions	Tasks
<p>-Help physically or mentally impaired people evacuate</p> <p>-Meet outside and come up with a response plan</p>	<p>-Come up with and implement an evacuation plan with the goal being to save the people in the store</p> <p>-Meet with other personnel outside of the store and decide on a response plan</p>

<ul style="list-style-type: none"> -Simultaneously call 911 for both medical and fire response teams -Care for anyone who sustained injuries from the fire 	<ul style="list-style-type: none"> -Call 911 and relay the information about the fire to the dispatcher -If the fire is small, use a fire extinguisher to put it out -If the fire is large, clear the parking lot and neighboring stores and wait for fire and medical response teams to arrive -Detect, perceive, and determine the specific type of injuries the customers have sustained -If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers
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Table B-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function "Respond to and Contain Fire"

Task	Decision-making	Response	Teamwork/Communication
Come up with and implement an evacuation plan with the goal being to save the people in the store	-Probabilistic - The personnel member must determine odds of the plan succeeding before implementing it	<ul style="list-style-type: none"> -Consider the odds of a successful evacuation when the plan is implemented -Revamp the plan if the odds are low -move through the store and sweep for any customers or volunteers who cannot get out or are unaware of the fire -shout for people to evacuate -clear the escape routes -help crippled people follow the escape routes -Evacuate once the store is clear -Very infrequent task; requires 100% accuracy in order to avoid casualties -Time critical task where everyone should be evacuated before the fire becomes too large -The personnel member should be standing or crawling depending on the amount of smoke -The personnel member may need to exert an upwards lift with significant force if a customer or volunteer needs to be carried out of the store 	-Teamwork and communication would be optimal during this step so that the store can be evacuated rapidly
Meet with other personnel outside of the store and decide on a response	-Relative - Personnel member must compare the proposed response plans	<ul style="list-style-type: none"> -Personnel should first gather in a designated area in front of the store -Personnel should propose one or more response plans -Then, personnel should decide on the response plan that is most appropriate for dealing with the fire 	<ul style="list-style-type: none"> -Teamwork and communication are critical during this step -The personnel need to coordinate and

plan		<ul style="list-style-type: none"> -If a decision cannot be made, the manager or most experienced volunteer has the authority to make the final decision -Very infrequent task; requires a high amount of accuracy if the store is to be saved (profits will be lost if it is destroyed) -Time critical task because the fire can spread beyond control if a plan is not decided on quickly (time depends on size of fire) -Personnel should be standing when they work on this task and should face each other while talking 	communicate in order to decide on the best response plan
Call 911 and relay the information about the fire to the dispatcher	<ul style="list-style-type: none"> -Absolute -The personnel member either calls 911 and relays all information about the fire or does not 	<ul style="list-style-type: none"> -A personnel member should use a cell phone to contact 911 -The personnel member should give the location of the store, the magnitude of the fire, whether there are any serious injuries, and any other applicable information -Very infrequent task; only contact with 911 and the divulgence of the location and that there is a fire need to be conducted with 100% accuracy, but the other actions should be at least somewhat accurate so that the response teams know what to bring 	<ul style="list-style-type: none"> -Teamwork is not required but communication is pivotal -The personnel member needs to communicate the fire emergency to the 911 dispatcher and cooperate
If the fire is small, use a fire extinguisher to put it out	<ul style="list-style-type: none"> -Relative -The personnel member needs to choose between using the A, B or C, fire extinguishers 	<ul style="list-style-type: none"> -A personnel member should first re-enter the store -Then, the personnel member should move to one of the three locations where the fire extinguishers are located and should retrieve one which corresponds to the type of fire (electrical fire, liquid fire, paper fire, etc...) -The personnel member should then move to the fire and attempt to extinguish it with the fire extinguisher -Very infrequent task; 100% accuracy is required if further damage to the store is to be avoided -Time critical task where time depends on the size of the fire and the location of the fire relative to flammable materials -This task should be conducted while standing or crouching depending on the location of the fire -To accomplish this task, the personnel 	<ul style="list-style-type: none"> -Teamwork and communication could be utilized if there are enough volunteers present -Because there are multiple fire extinguishers available, the personnel could work together to extinguish a fire

		member needs to lift the fire extinguisher with a significant amount of force, carry it to the location of the fire, release the pin, aim the tube at the base of the fire, squeeze the lever, and make a sweeping motion while aiming at the base of the fire.	
If the fire is large, clear the parking lot and neighboring store and wait for fire and medical response teams to arrive	-Absolute -The personnel either clear the parking lot and neighboring store or do not	-Set up cones in the parking lot -Wave incoming vehicles away and notify drivers that space is required for the fire trucks, ambulances, etc... -Enter neighboring store (an hispanic grocery) and notify staff of the fire -Help staff evacuate neighboring store -Very infrequent task; high accuracy is required so that the response to the fire is fluid and so that the customers in the neighboring store are safe -This task is not time critical but should be completed before the response teams arrive -This task should be conducted while standing to facilitate movement -To accomplish this task, the personnel member needs to approach drivers and ask them to vacate the area in front of the store. The personnel member also needs walk into the neighboring store and ask the staff to evacuate the store.	- Communication is imperative, and teamwork would facilitate the completion of the task -The personnel member needs to communicate with drivers and the staff in the neighboring store in order to successfully complete this task -The personnel member should also coordinate with the other personnel so that drivers and the staff in the neighboring store can be notified simultaneously
Detect, perceive, and determine the specific type of injuries the customers have sustained	-Relative -The personnel member needs to compare different medical problems that can be caused by fire and then determine which one(s) the customers	-Approach every customer and look for any signs of injuries -If an injury is detected and perceived, determine the type of injury (burn, excessive smoke inhalation, bruise, etc...) -Very infrequent task; enough accuracy is required so that all serious or life-threatening injuries are identified -This task is time critical and time available depends on the severity of the injuries sustained -This task should be conducted in a	- Communication and teamwork are not necessary for this task as it is an individual task. -However, coordination among personnel

	may be experiencing	position where the injuries of the customers can be assessed without hindrance -No biomechanics are required for this task other than positioning oneself so that the injuries of the customers' can be assessed.	members when assessing injuries would reduce the time needed for this task
If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers	-Relative -The qualified personnel should evaluate all the proposed treatment plans	-Establish a perimeter around the injured customer so that qualified personnel and customers have space to work with -Only personnel or customers with medical experience or training should be permitted to enter the area around the customer -Discuss potential treatment options based on the customer's injuries -Decide on a treatment option -When no decision can be reached and there is no medical professional present, the manager or most experienced volunteer should have the final say -Implement the treatment option -Infrequent task; 100% accuracy is required if the customer's is at risk of dying before medical teams arrive -Time critical task where time depends on the severity of the injuries -The task should be completed while crouching or bent over because the debilitated customer should be sitting or lying on the ground -The personnel member should be talking to both the other people present and the debilitated customer -The specific biomechanics required depend on the kind of treatment plan developed	-Teamwork and communication are imperative for this task -The qualified personnel and customers should first communicate with each other in order to develop an effective treatment plan -They should then convey the details of the plan to the customer if he or she is conscious -Then, the qualified personnel and customers should coordinate and share roles in order to successfully implement the treatment plan

Table B-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function "Respond to and Contain Fire"

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Come up with and	-A written fire	-There is no	-Panic (caused	-Medium

implement an evacuation plan with the goal being to save the people in the store	response plan is in the back of the store -2 escape routes (and 2 doors) are available for this task	established workplace or worksite for this task -At this point, the store could be noisy, smoky, and hot due to panic and the fire	by time pressure) and stress could hinder this task (cloud decision-making) -Lack of experience with responding to fires could hinder this task -Obstinance when confronted by directions from other personnel could also hinder this task -The fire and smoke may impede the implementation of the plan -Reduced staffing could make it hard to quickly evacuate the store -Merchandise or fire could block escape routes and thus complicate the evacuation	potential for personal injury -The fire and smoke pose a threat to the volunteer or manager if the fire is large enough
Meet with other personnel outside of the store and decide on a response plan	-A written fire response plan is in the back of the store (unavailable at this point)	-The ingress and egress paths to the designated meeting place should be clear as they are outside of the store -The meeting place is outside so conditions would depend on the weather and the time of year -Because the store is not open at night and is near a major	-Panic (caused by time pressure) and stress could hinder this task (cloud decision-making) -The personnel may not work well together and may not be able to have a fruitful discussion	-Low potential for personal injury -This task is completed outside of the store and away from the fire

		roadway, the meeting place will always be lit but could be in a noisy area	-Reduced staffing could make it hard to come up with ideas on how to respond to the fire	
Call 911 and relay the information about the fire to the dispatcher	-A written fire response plan is in the back of the store (unavailable at this point)	<ul style="list-style-type: none"> -The ingress and egress paths to the calling location should be clear as it is outside of the store -The calling location is outside so conditions would depend on the weather and the time of year -Because the store is not open at night and is near a major roadway, the calling location will always be lit but could be in a noisy area -The call should be made away from other people so as to reduce noise 	-Panic (caused by time pressure) and stress could hinder this task because they could make it hard for the personnel member to clearly explain the fire emergency to the dispatcher	<ul style="list-style-type: none"> -Low potential for personal injury -This task is completed outside of the store and away from the fire
If the fire is small, use a fire extinguisher to put it out	<ul style="list-style-type: none"> -A written fire response plan is in the back of the store -5 fire extinguishers of kinds A, B, and C are available for this task -Directions for how to operate the fire extinguishers are found on all of them 	<ul style="list-style-type: none"> -The ingress and egress paths to the fire could be blocked or inaccessible due to smoke -About 6-8 feet of space is required to perform the task -The workspace will be loud and hot due to the fire alarms and the fire 	<ul style="list-style-type: none"> -Panic (caused by time pressure) and stress could hinder this task because they could cause the personnel member to fumble with the extinguisher -The fire and smoke may hamper the personnel member's ability to use the fire extinguisher 	<ul style="list-style-type: none"> -Medium potential for personal injury -If the fire is still small, then smoke poses the greatest risk to the personnel

			-A lack of experience with fire extinguishers could also hinder this task	
If the fire is large, clear the parking lot and neighboring stores and wait for fire and medical response teams to arrive	-A written fire response plan is in the back of the store	<ul style="list-style-type: none"> -The ingress and egress paths on the street should be clear unless there are vehicles in the way -The ingress and egress paths in the Bodega store should be clear unless there are merchandise or carts in the way -The location where drivers are asked to vacate the area outside of the store is outside so conditions would depend on the weather and the time of year -Because the store is not open at night, this location will always be lit -This location will be very noisy because cars will be honking due to confusion about the traffic -The bodega is dimly lit, very small and sometimes crowded, and fairly quiet 	<ul style="list-style-type: none"> -Panic (caused by time pressure) and stress could hinder this task because they could lead to impatience and erratic behavior -Reduced staffing would hinder this task because multiple personnel are needed to complete this task in an efficient manner 	<ul style="list-style-type: none"> -Medium potential for injury in the parking lot, low potential for injury in the Bodega -In the parking lot, vehicles are a hazard to the personnel member because they could potentially hit the personnel member if the driver does not see him or her -In the Bodega, there is a low potential for injury unless the fire has spread into it (in which case, the other stores on the block should be notified)
Detect, perceive, and determine the specific type of injuries the customers have sustained	N/A	-This task is completed outside of the store on the sidewalk, so conditions would depend on the weather and the time	-Panic (caused by time pressure) and stress could hinder this task because they could lead to	-Low potential for personal injury as this task is fulfilled away from the fire

		of year -The egress and ingress paths might be blocked by customers or onlookers -Because the store is not open at night, this location will always be lit -The noise level depends on the amount of traffic and number of people present	impeded situational awareness	
If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers	-1 first aid kit in store is available for this task but is potentially inaccessible	-This task is completed outside of the store so conditions would depend on the weather and the time of year -The ingress and egress paths should be clear if a perimeter was established around the injured customer -Because the store is not open at night, this location will always be lit -The noise level depends on the amount of traffic and number of people present	-Panic (caused by time pressure) and stress could hinder this task (cloud decision making) -A lack of medical experience and reduced staffing could also hinder this task because these factors would make it harder to develop an appropriate treatment plan	-Low potential for personal injury as this task is fulfilled away from the fire

Table B-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function "Respond to and Contain Fire"

Task	Narrative of Activities	Applicability	Time Required
Come up with and implement an evacuation plan with the goal being to save the people	The volunteer or manager thinks about the evacuation plan with the greatest chance of success. Then, the personnel member implements this plan which	Without an effective evacuation plan, customers or volunteers might be left behind in the store and could	5 minutes (Some of the customers may not be able to exit the store without physical assistance)

in the store	should include sweeping the store for any remaining customers or volunteers, shouting directions to evacuate, helping people along the escape routes, and then escaping once everyone else has evacuated	suffer serious injuries from the fire and smoke	
Meet with other personnel outside of the store and decide on a response plan	First, personnel must congregate in any spacious area outside of the store. Then, the personnel must discuss potential response plans and decide on the one that would most effectively combat the fire while avoiding casualties. The manager or most experienced personnel member has the final say in this discussion.	With an effective response plan, the store could potentially be saved which would prevent the store from losing profits.	1 minute (The personnel may not be able to decide on a plan due to panic or a dispute)
Call 911 and relay the information about the fire to the dispatcher	First, the personnel member needs to find a cell phone which can either be their own or someone else's. Then, the personnel member needs to dial 911 and wait for the dispatcher to answer. The personnel member should divulge all of the information about the fire and should mention the location of the store and whether there have been any injuries.	This task is necessary to maximize the probability of saving the store and saving customers or volunteers with injuries. This is because fire and medical response teams are more qualified than the store's personnel when it comes to this situation.	3 minutes (The phone service could be low and the caller may not be able to convey the emergency quickly)
If the fire is small, use a fire extinguisher to put it out	First, one or more personnel members should enter the store and retrieve either A, B, or C fire extinguishers depending on the source of the fire. They should then carry the fire extinguishers to the fire and use them to extinguish the fire. They should stand about 6-8 feet away from the fire and then	This task is useful in that it can be used to save the store and therefore profits before the fire grows out of control	2 minutes (The personnel may have to search for the extinguishers and may not know how to operate them)

	spray the fire extinguisher at the base of the fire.		
If the fire is large, clear the parking lot and neighboring stores and wait for fire and medical response teams to arrive	One personnel member should walk into the parking lot in front of the store and should wave cars away from the spaces in front of the store. This is so that fire trucks, ambulances, and other response vehicles will have an area to park within. Meanwhile, another personnel member should enter the neighboring Bodega store and tell the staff that there is a fire in the thrift store. The personnel member should then help the Bodega staff member evacuate the Bodega.	This task is necessary so that the response teams can put out the fire in the store and address the customer's' injuries as fast as possible. Also, the safety of the customers in the Bodega store is ensured by encouraging the evacuation of that store.	10 minutes (It could take 5-10 minutes for response crews to arrive depending on traffic)
Detect, perceive, and determine the specific type of injuries the customers have sustained	One or more personnel members should first approach a customer who had to evacuate the store. They should then ask the customer if he or she is alright and should identify whether or not the customer sustained any injuries. If he or she did, the personnel members should make an effort to identify the injury. The personnel members should repeat this process for each customer and should then focus their attention on those with the most serious injuries.	This task is important because it is when any fire-related injuries the customers sustained are identified. Without this task, the customers' safety would be in danger because their injuries would not be addressed.	30 seconds (multiple customers may have injuries and some may be inconspicuous)
If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers	First, the personnel member should approach the customer who was determined to have the worst injuries. This personnel members should then establish a perimeter around the injured customer and should only let personnel and	This task is important because a customer with grievous injuries could potentially be saved if the personnel and customers use a smart treatment plan	10 minutes (response crews could take 5-10 minutes for response crews to arrive)

	customers with medical training or experience enter the perimeter. Then, the qualified personnel members and customers should develop a treatment plan to treat the injuries. They should then decide upon and implement the best treatment plan.		
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Table B-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Respond to and Contain Fire"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Come up with and implement an evacuation plan with the goal being to save the people in the store	-Cognitive: 3.6/5* -Physical: Medium (Customers may need to be lifted and heavy merchandise may need to be cleared out of the way) -Overlap of task requirements: Serial	At least 2	Physical ability to carry customers/volunteers to the exits if needed and knowledge of the escape routes
Meet with other personnel outside of the store and decide on a response plan	-Cognitive: 3.9/5 -Physical: Low -Overlap of task requirements: Parallel	At least 2	Knowledge of the english language and ability to stay calm and communicate
Call 911 and relay the information about the fire to the dispatcher	-Cognitive: 3.6/5 -Physical: Low -Overlap of task requirements: Parallel	At least 2	Knowledge of the fire and situational awareness are needed. Knowledge of the english language and ability to stay calm and communicate are also needed in order to effectively communicate with the 911 dispatcher
If the fire is small, use a fire extinguisher to	-Cognitive: 3.9/5* -Physical: Medium	At least 2	Knowledge of fire and situational awareness

put it out	(depends on the size of the extinguisher used) -Overlap of task requirements: Serial		are needed. Knowledge of the locations of the fire extinguishers and the difference between the A, B, and C fire extinguishers, and the ability to use a fire extinguisher, are also needed
If the fire is large, clear the parking lot and neighboring stores and wait for fire and medical response teams to arrive	-Cognitive: 3.9/5* -Physical: Low -Overlap of task requirements: Serial	At least 3	One personnel member definitely needs to know English to communicate with drivers and must have the confidence needed to control them. The other personnel member should have a basic command of Spanish so that he or she can communicate effectively with the staff in the Hispanic Bodega.
Detect, perceive, and determine the specific type of injuries the customers have sustained	-Cognitive: 3.9/5* -Physical: Low -Overlap of task requirements: Parallel	At least 2	At least one personnel member should understand english so that he or she can quickly respond to a customer's cry for help or description of injuries. In addition, at least one personnel member should have basic medical knowledge and strong situational awareness so that he or she can identify and determine the various injuries which customers have sustained.

If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers	-Cognitive: 3.9/5* -Physical: Medium (depends on treatment plan) -Overlap of task requirements: Serial	At least 2	At least one of the personnel members should know English so that he or she can discuss potential treatment options with the other personnel and customers. All personnel members present should also have medical experience or training so that they can come up with an effective treatment plan. Finally, one personnel member (or customer) should also know the language that the debilitated customer speaks so that the customer can be notified of the treatment plan before it proceeds (if the customer is conscious).
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Section B.5: Questionnaire for Fire Safety Functions

This section presents the questionnaire used for collecting data and a summary of the responses to the questions. The data collection methods used are Talk-Through and Walk Through.

Manager:

-What exactly is your role in this store?

He is the Store Manager, which means he facilitates the work the volunteers do and moderates conflicts between volunteers and/or customers.

-How many smoke detectors do you have in this facility? Are they tested frequently?

There are no smoke detectors present. However, there are 2 pull stations which are tested infrequently.

-How many fire alarms or other indicators do you have in this facility? How are they triggered, where are they located, and what kind of cues are they (visual vs. auditory)? Do different indicators mean different things?

There are three audio alarms and four visual indicators with strobe lights. These indicators are triggered by manual activation through two pull stations. The auditory and visual indicators are found throughout the store and in the back of the store. There is one pull station near the entrance of the store, and another near the back door.

-What are some of the factors that may make it hard for these indicators to be acknowledged by customers or volunteers?

The most significant factor is the presence of bulk merchandise in front of the indicators. Also, due to the size of the store, some customers may choose to disregard the indicators if they do not actually see a fire.

-Do you have a procedure or plan that you follow when a fire is present?

There is no written plan but the manager will verbally give commands. He will tell everyone to evacuate, will have one person pull the pull station, and will have one person call 911.

-If you had to evacuate the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to evacuate the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-How many fire extinguishers are there?

There are 5 extinguishers which are of types A, B, and C.

-Who decides upon the plan of action and where do they do that?

The volunteers and the manager decide upon the plan of action and they do that directly in front of the store after everyone has safely evacuated.

-Are any of the volunteers trained in fire safety so that they can easily respond to a fire and decide upon a specific plan of action?

No but the manager has extensive fire safety experience.

-Do you have the final say as to what the plan will be?

The manager has the final say because he has the most experience.

-Under what circumstances would you diverge from the established fire escape plan?

One circumstance is when a fire or obstacle is blocking the front door. In this case, the back door would be used. The reason why using the back door is not optimal is because the alley it leads to is frequently blocked by CVS dumpsters. Another circumstance is when there is a customer with special needs who cannot easily evacuate. If this were to occur, the volunteers would try to help the customer escape before they decide on a plan of action.

What factors might lead to the wrong decision?

-One factor which might lead to the wrong decision is obstinance. Many of the volunteers do not like to be micromanaged, and therefore might be unwilling to follow a plan they do not agree

with. Also, panicked thinking and a lack of fire experience might lead to the wrong decision by the volunteers.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when evacuating the store?

1

-About how much time would it take you to evacuate the store?
It would take him 10 to 15 seconds.

-What kind of problems can volunteers or customers face along the escape routes? Are they wide enough? Are there sometimes obstacles in the way?
Clothing racks can sometimes be in the way and bulk merchandise can also be an impediment along the escape routes. Some are not wide enough due to clothing racks or large items which constrain the walkways.

-What would you and the other volunteers do while waiting for response teams to arrive?
He and the other volunteers would rally in an assembly point in the parking lot and would attempt to keep traffic moving to make room for the fire trucks and ambulances. They would also notify the neighboring Bodega.

-What would you and the other volunteers do if a customer was injured by the fire?
He and the other volunteers would provide immediate first aid.

-If you had to respond to the fire and/or to customers' injuries, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Moderate

-If you had to respond to the fire and/or to customers' injuries, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
Little

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to the fire and customers' injuries?
1

-About how much time would it take you to respond to the fire and the customers' injuries?
It would take him seconds to respond to the fire and the customers' injuries

-How close is the nearest fire station and hospital?
The nearest fire station is very close (2-3 minutes). The nearest hospital is Fairfax hospital which is a 7 to 8 minute drive from the store.

-Has the store had any fires in the past? If so, do you have data logs or reports about the fires?
One fire occurred due to an outdated motor overheating in the vault room. This incident was reported to the manager's boss. There have also been multiple trashcan fires and car fires in the area around the store. There are no data logs or significant reports about the past fires.

Volunteer 1:

-Are there any tasks you perform in this store other than acting as the cashier? About how much time do you spend on your tasks?

She spends almost all of her time working as the cashier. She usually spends 3 hours working at the cash register.

-Where is your workstation? Is your workstation in a position from which you can view fire alarms and other fire indicators?

Her workstation is in the front of the store where the cash register is located. It is in a position where she can view two fire alarms at once and can easily hear the audio indicators.

-What are some factors that might distract you or make it hard for you to detect a fire? Why?

The only factor which might make it hard for her to detect a fire is if it is in the back of the building and no one pulls the lever at a pull station.

-Is there a fire escape plan you should follow? Is it on paper or do you remember it?

There is no established fire escape plan because the store is so small. Her first instinct is to get all of the customers out of the store immediately.

-If you had to evacuate the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Extensive

-If you had to evacuate the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Moderate

-Are you aware of all fire escapes and of the locations of fire safety equipment, such as fire extinguishers?

She is aware of the fire escapes but is not aware of the locations of fire safety equipment.

-Have you received training regarding what you should do when confronted by a fire? If so, are you retrained on a continuous basis?

She has fire safety experience from working in government, and was retrained while she worked in the government. However, she no longer receives training now that she is retired.

-When there is a fire, do you meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?

Everyone meets outside the front of the store with the manager to discuss a plan of action. Mike has the authority to make the final decision. If Mike is not present, then the volunteer with the most fire safety experience can make the final decision.

-How problematic do you think the language barrier between the volunteers and spanish-speaking customers will be when a fire is present?

Not a big deal because the volunteers know basic Spanish and can pull the lever on the pull stations to trigger the fire indicators.

-Can you and the other volunteers easily give directions to the customers and lead them to the fire exits? How?

Yes. They can run through the store and make sure that all customers know that there is a fire and know where the fire exits are located. This is possible due to the small size of the store.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when evacuating the store?

-About how much time would it take you to evacuate the store?
It would take her about 5 minutes.

-What are some factors in this store that may impede the implementation of an escape plan?
How will they impede it?
The presence of obstacles such as bulk merchandise or the sudden combustion of a flammable material along the escape routes may impede the implementation of an escape plan because the volunteers would have to come up with another escape route.

-If you had to respond to the fire and/or to customers' injuries, would you say the level of conscious mental effort or concentration is required is very little, moderate, or extensive?
Extensive

-If you had to respond to the fire and/or to customers' injuries, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
High to very intense

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to the fire and customers' injuries?
4

-About how much time would it take you to respond to the fire and the customers' injuries?
It would take her about 1 hour.

Volunteer 2:

-What are the different tasks that you perform in the store? About how much time do you spend on your tasks?
She distributes priced items in the store, acts as the cashier, and prices some items. She spends around 3 hours on these tasks.

-Where are your workstations? Are your workstations in positions from which you can view fire alarms and other fire indicators?
When she is distributing merchandise, she works throughout the store. When she is pricing, she works at a workbench in the employee-only area at the back of the store. She can view the fire alarms and other fire indicators from her workstations unless someone is in her way.

-What are some things that might distract you or make it hard for you to detect a fire? Why?
She might not detect a fire if she is working with a customer or is busy pricing and when no one has pulled the lever at a pull station.

-Is there a fire escape plan you should follow? Is it on paper or do you remember it?
There is no established fire escape plan.

-If you had to evacuate the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
extensive

-If you had to evacuate the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High to very intense

-Are you aware of all fire escapes and of the locations of fire safety equipment, such as fire extinguishers?

She is aware of the fire escapes as there are only two, but is not aware of the locations of the fire safety equipment.

-Have you received training regarding what you should do when confronted by a fire? If so, are you retrained on a continuous basis?

She received fire response training every 3-6 months at a previous job in the state department.

-When there is a fire, do you meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?

She says the volunteers and the manager would likely meet to discuss a plan. There is no established meeting place but she says that it would likely be in front of the store. The manager would have the authority to make the final decision.

-What factors might result in an unsatisfactory plan or decision?

One factor that might result in an unsatisfactory plan is if power goes out during the implementation of the plan. Panic is another factor that can result in an unsatisfactory plan or decision.

-How problematic do you think the language barrier between the volunteers and Spanish-speaking customers will be when a fire is present?

There would be no problem because yelling "fire" is enough to let anyone know that there is a problem (and this volunteer speaks fluent Spanish).

-Can you and the other volunteers easily give directions to the customers and lead them to the fire exits? How?

The volunteers would both yell fire and lead customers to the fire exits. The volunteers would also sweep the area to make sure there are no stragglers.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when evacuating the store?

5

-About how much time would it take you to evacuate the store?

It would take her under 15 to 20 seconds to evacuate the store.

-What are some factors in this store that may impede the implementation of an escape plan? How will they impede it?

The primary factor which may impede the implementation of an escape plan is if merchandise blocks the escape routes. This could happen as a result of customers or volunteers knocking into merchandise as they rush out of the store.

-If you had to respond to the fire and/or to customers' injuries, would you say the level of conscious mental effort or concentration is required is very little, moderate, or extensive? Extensive

-If you had to respond to the fire and/or to customers' injuries, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High to very intense

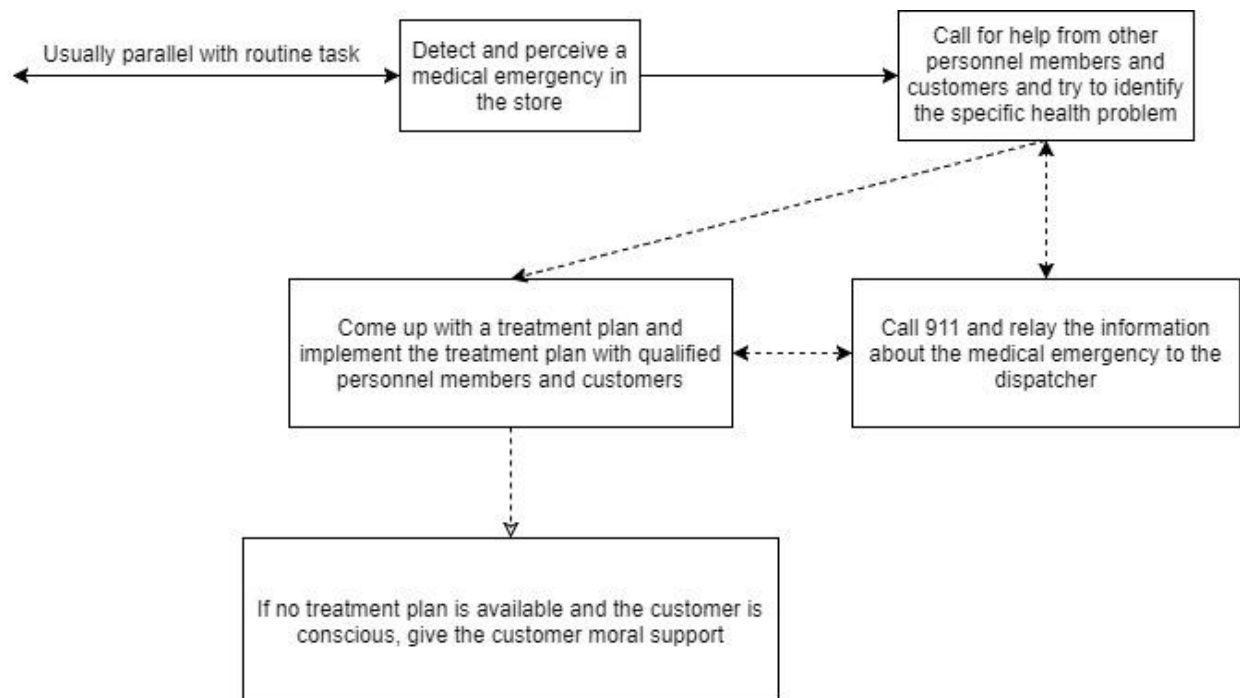
-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to the fire and customers' injuries?

5

-About how much time would it take you to respond to the fire and the customers' injuries?
It would take her about a minute to respond to the fire and the customers' injuries.

Appendix C: Safety Function - Help Customer Who is Having a Medical Emergency

Section C.1: Task Diagram for Function “Help Customer Who is Having a Medical Emergency”



- Shaded Arrow: Linear Relationship
- Unshaded Arrow: Conditional Relationship
- ↔ Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- - - Dotted Stem: Usually a coordinated effort

Section C.2: FRA for Function “Help Customer Who is Having a Medical Emergency”

Table C-1: FRA - Processes, Systems, and Components/Human Actions for Function “Help Customer Who is Having a Medical Emergency”

Processes	Systems	Components/HAs
-People within store who can help the customer who is having a medical emergency	-volunteers -customers -manager -Detect injuries or other health problems -Respond to health problems	-Visual, auditory, or olfactory acknowledgement of a medical emergency -Work with other volunteers, the manager, and customers to determine the specific problem and come up with a treatment plan -Implement the treatment plan -3 land line phones for calling 911 -1 First aid kit

Table C-2: FRA - Purpose and Conditions Indicating Need and Availability for Function “Help Customer Who is Having a Medical Emergency”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To ensure customer safety (safety function)	<ul style="list-style-type: none"> -The customers who frequent the store are generally elderly and many have medical issues -Medical emergencies such as heart attacks and strokes can occur without warning, so the store needs to be ready to respond 	<ul style="list-style-type: none"> -The first aid kits are checked to make sure that they contain tools which can be used to treat a variety of health problems -The batteries in the phones are frequently replaced -There are at least 2 personnel present

Table C-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function “Help Customer Who is Having a Medical Emergency”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
<ul style="list-style-type: none"> -A personnel member or customer detects and perceives a medical emergency in the store and calls for help -More personnel members and customers arrive on the scene and attempt to diagnose the problem -At least one personnel member or customer calls 911 while the others come up with a treatment plan -The treatment plan is either implemented or the customer is given moral support as medical crews arrive 	<ul style="list-style-type: none"> -The medical problem was successfully identified -An effective treatment plan was developed and implemented in order to save the customer -A phone was used to call 911 and a first aid kit was used if needed -The customer was assisted by others until an ambulance arrived 	<ul style="list-style-type: none"> -The medical crews can be notified if the emergency was a false alarm -If a customer or volunteer misidentified or lied about a medical emergency -If the medical emergency does not persist -If the customer passes suddenly from an untreatable emergency

Section C.3: FA for Function “Help Customer Who is Having a Medical Emergency”

Table C-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Help Customer Who is Having a Medical Emergency”

Current allocation	Optimal allocation
<i>Manual control:</i> Both the detection and response components of this function are	<i>Manual control:</i> Because of the variability of medical conditions could have, automating this function would only serve to complicate

accomplished by humans without any automation. The personnel do have access to tools, such as telephones and first aid kits, which facilitate the completion of this function.	situation. Furthermore, a machine could misidentify or mistreat a customer, creating a problem which would only make matters worse. Also, the store is not able to afford a machine of this nature. With manual control, the personnel and other customers might not be able to effectively respond to a medical emergency, but they should at least be able to call 911 and request assistance.
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Section C.4: Task Analysis for Function “Help Customer Who is Having a Medical Emergency”

Table C-5: Task Analysis - Human Actions and Tasks for Function “Help Customer Who is Having a Medical Emergency”

Human Actions	Tasks
<ul style="list-style-type: none"> -Visual, auditory, or olfactory acknowledgement of a medical emergency -Work with other volunteers, the manager, and customers to determine the specific problem and come up with a treatment plan -Implement the treatment plan 	<ul style="list-style-type: none"> -Detect and perceive a medical emergency in the store -Call for help from other personnel members and customers and try to help the customer with their health problem -Call 911 and relay the information about the medical emergency to the emergency services -Come up with a treatment plan and implement the treatment plan with the help of other personnel members and customers -If no treatment plan is available and the customer is conscious, give them first aid and support

Table C-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function “Help Customer Who is Having a Medical Emergency”

Task	Decision-making	Response	Teamwork/Communication
Detect and perceive a medical emergency in the store	<ul style="list-style-type: none"> -Absolute -The personnel member either detects and perceives a customer who appears to be in pain or does not 	<ul style="list-style-type: none"> -Acknowledge customer who is having a medical emergency and move to him or her -Assess the health problem in greater detail once contact is established -Infrequent task; high amount of accuracy is required but not complete accuracy because a customer could accomplish this task -Time critical task where time depends on the severity of the medical emergency 	<ul style="list-style-type: none"> -No teamwork or communication are needed for this task as it is an individual task

		<ul style="list-style-type: none"> -Moving to the customer should be conducted while standing, and perceiving the emergency should be completed while crouching next to the customer if he or she is prone, or by standing next to the customer if he or she is still standing -No biomechanics other than running to the debilitated customer are required 	
Call for help from other personnel members and customers and try to identify the specific health problem	<ul style="list-style-type: none"> -Probabilistic -When identifying the specific health problem, the qualified personnel need to determine the odds that the symptoms the customer is experiencing are correlated with a certain medical issue 	<ul style="list-style-type: none"> -The personnel member (or customer) needs to call for help from the other people in the store -Then, the personnel members and customers need to work together to identify the specific injury or health problem so that an effective treatment plan can be developed -Infrequent task; Enough accuracy is required so that the customers and personnel members know the severity of the emergency -Time critical task where time depends on the severity of the medical emergency -The task should be completed while crouching next to the customer if he or she is prone, or by standing next to the customer if he or she is still standing -The personnel member should yell for help and then talk with others when identifying the problem -The personnel member should survey the entire customer in order to ascertain all of the symptoms 	<ul style="list-style-type: none"> -Teamwork and communication are necessary for this task -The personnel member needs to communicate that there is an emergency to the other people in the store -Then, the personnel member needs to communicate and coordinate with others in order to identify the injury or health problem
Call 911 and relay the information about the medical emergency to the dispatcher	<ul style="list-style-type: none"> -Absolute -The personnel member either calls 911 and relays all information about the medical emergency or does not 	<ul style="list-style-type: none"> -The personnel member either needs to move to one of the three landline phones or take out his or her cell phone -Then, the personnel member needs to relay information about the store location and medical emergency, including the specific medical problem the customer is having as well as the duration of the emergency, to the 911 dispatcher -Infrequent task; enough accuracy is required so that the medical crews are aware of the location of the store as well as the type of health problem they will be confronting -Time critical task because the medical 	<ul style="list-style-type: none"> -Physical teamwork is not required for this step but communication is very important -The personnel member needs to be able to communicate the details of the medical emergency in a quick and efficient manner to the

		<p>crews should be given early notice about the emergency</p> <ul style="list-style-type: none"> -The task should be completed while standing -The personnel member needs to walk to a phone or pull a cell phone out of his or her pocket, exert a small upward force on the phone to bring it to ear level, dial 911, and then speak to the operator 	911 dispatcher
Come up with a treatment plan and implement the treatment plan with qualified personnel	<ul style="list-style-type: none"> -Relative -The qualified personnel should compare the various treatment plans which were proposed 	<ul style="list-style-type: none"> -Establish a perimeter around the debilitated customer and only let personnel and customers with medical training or experience enter the area -Discuss potential treatment options with the qualified personnel and customers - -When no decision can be reached and there is no medical professional present, the manager or most experienced volunteer should have the final say -Implement the treatment plan with the available supplies and first aid kit -If the 911 dispatcher gives advice, that advice should be acknowledged during development of the plan -Infrequent task; 100% accuracy is required if the customer's is at risk of dying before medical teams arrive -Time critical task where time depends on the severity of the medical emergency -The task should be completed while crouching or bent over because the debilitated customer should be sitting on a chair or on the ground -The personnel member should be talking to both the other people present and the debilitated customer -The specific biomechanics required depend on the kind of treatment plan developed 	<ul style="list-style-type: none"> -Teamwork and communication are very important during this step -The personnel member needs to communicate with and coordinate with the other people present in order to determine the best treatment plan and so that the risk of individual human error during delivery of the plan can be lessened
If no treatment plan is available and the customer is conscious, give the customer moral support	<ul style="list-style-type: none"> -Absolute -The personnel either give the debilitated customer moral support or 	<ul style="list-style-type: none"> -If the medical problem cannot be diagnosed or if no treatment plan can be developed, the best option is to offer the customer support until medical professionals arrive -The group of personnel members and customers should give the debilitated customer space and should also give him or her moral support 	<ul style="list-style-type: none"> -Teamwork and communication are both very important during this step -The qualified personnel and customers present should

	do not	<ul style="list-style-type: none"> -They should say things such as “Help is on its way” and “You are doing great” -Infrequent task; accuracy is definitely required. Even if giving moral support will not necessarily save the customer, at least the personnel are attempting to ensure the customer’s wellbeing and safety -Task is not time critical; it persists until medical crews arrive -The task should be completed while crouching or bent over because the debilitated customer should be sitting on a chair or on the ground -No significant biomechanics are required during this task other than those associated with speaking to the customer 	<p>work together to ensure that the customer is in a comfortable position and is not losing hope</p> <ul style="list-style-type: none"> -They should console the customer with calming words and should communicate the status of the situation to him or her
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Table C-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function “Help Customer Who is Having a Medical Emergency”

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Detect and perceive a medical emergency in the store	N/A	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so noise levels depend on the time of day but the temperature and lighting will be at comfortable levels 	<ul style="list-style-type: none"> -Debilitated customer may not be able to convey that he or she is having a medical emergency due to being unconscious -The constant flow of customers into and out of the store makes it difficult to determine if any are having medical emergencies -Reduced staffing would make it harder to detect and perceive a medical emergency quickly (less coverage in the store) -Forgetfulness on 	<ul style="list-style-type: none"> -Low potential for personal injury unless the customer’s medical emergency is caused by a contagious pathogen

			<p>behalf of the debilitated customer (caused by dementia or other problems) could make it hard for the customer to convey possible causes of the health problem and thus make it hard to identify the health problem</p>	
<p>Call for help from other personnel members and customers and try to identify the specific health problem</p>	N/A	<p>-There is no established worksite for this task -This task will occur in the store, so the temperature and lighting will be at comfortable levels -The noise may be high due to the panic which accompanies the emergency</p>	<p>-Panic (caused by time pressure) and stress could hinder this task because they could impede one's ability to identify the health problem -A language barrier between the debilitated customer and personnel member or unconsciousness could make it hard to identify the health problem which is afflicting the customer</p>	<p>-Low potential for personal injury unless the customer's medical emergency is caused by a contagious pathogen</p>
<p>Call 911 and relay the information about the medical emergency to the dispatcher</p>	<p>-The store has 3 different land-line phones which can be used to call 911</p>	<p>-This task could appear at either of the three landline phones -At these stations, the ingress and egress paths could be blocked by heavy merchandise -If the call is made with a portable cell phone, then</p>	<p>-Panic (caused by time pressure) and stress could hinder this task because they could hinder one's ability to clearly convey the medical emergency</p>	<p>-Low potential for personal injury as long as the call is made away from the debilitated customer if he or she is sick</p>

		<p>there are no established ingress or egress paths</p> <p>-This task will occur in the store, so the temperature and lighting will be at comfortable levels</p> <p>-The call should be made away from the other people in the store so that the background noise will not drown out the personnel member's voice</p>		
<p>Come up with a treatment plan and implement the treatment plan with qualified personnel members and customers</p>	<p>-The store has 1 first aid kit which can be used during this task</p>	<p>-There is no established worksite for this task</p> <p>-This task will occur in the store, so the temperature and lighting are set at comfortable levels</p> <p>-The noise may be high due to the panic which accompanies the emergency</p>	<p>-Panic (caused by time pressure) and stress could hinder this task (cloud decision making)</p> <p>-A language barrier between the qualified personnel and customers could make it hard to come up with and implement a treatment plan</p> <p>-A language barrier between the qualified personnel and the debilitated customer could also hinder this task because the customer might resist a treatment plan which he or she does not understand</p>	<p>-Low potential for personal injury unless the customer's medical emergency is caused by a contagious pathogen</p>

			<ul style="list-style-type: none"> -Reduced staffing could hinder this task because there might not be enough personnel present to execute the plan -A lack of supplies or inability to get through the customer's clothing are also factors that could complicate this task 	
If no treatment plan is available and the customer is conscious, give the customer moral support	N/A	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level should be lower by now and should be produced by the conversation with the debilitated customer 	<ul style="list-style-type: none"> -Panic (caused by time pressure) and stress could hinder this task because if the personnel are panicked and stressed, they would have trouble giving moral support -A language barrier between the qualified personnel and the debilitated customer could hinder this step because moral support should not be given in a language the customer does not understand 	-Low potential for personal injury unless the customer's medical emergency is caused by a contagious pathogen

Table C-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function "Help Customer who is Having a Medical Emergency"

Task	Narrative of Activities	Applicability	Time Required
Detect and perceive a medical emergency in the store	First, a personnel member (or customer) detects a medical emergency by an auditory, olfactory, or visual cue. Then, this individual moves to the debilitated customer and analyzes the	This task is imperative so that a customer's medical emergency can be addressed in a timely manner	20 minutes (customer could pass out in bathroom or dressing room)

	injury or health problem he or she is experiencing.		
Call for help from other personnel members and customers and try to identify the specific health problem	The personnel member (or customer) must shout for help and give information such as "this customer is hurt!". Then, the personnel member must work with other people in the store to identify the source of the customer's pain or symptoms	This task is important because it sets the stage for the development of a treatment plan which will hopefully save the customer	30 seconds (the customer's clothes may have to be removed or the customer may need to be repositioned in order for his or her health problem to be identified)
Call 911 and relay the information about the medical emergency to the dispatcher	The personnel member must first access a phone, which can either be one of the three landline phones in the store or a cell phone. Then, the personnel member must dial 911 and wait for the operator to answer. The personnel member must then describe the medical emergency and give the location of the store so that medical crews will be informed of the emergency.	This task is very important because if the personnel and customers present are unable to diagnose or treat the customer's medical condition, then a trained medical response team will act as backup	3 minutes (The phone service could be low and the caller may not be able to convey the emergency quickly)
Come up with a treatment plan and implement the treatment plan with qualified personnel members and customers	The personnel member must first establish a perimeter around the debilitated customer and should ask onlookers to clear the area. If the personnel member has little medical experience, he or she should also vacate the area unless none of the other people present is more qualified. The personnel member should then consult volunteers or customers with medical experience before deciding on a treatment plan. The people present should account for the 911 dispatcher's advice before a decision is reached. Then, the personnel member and the others present should decide on the best treatment plan and should then	This task is critical because a concerted effort on behalf of the people present could potentially save the debilitated customer	15 minutes (medical personnel could take anywhere from 5-15 minutes to arrive)

	coordinate the implementation of that plan.		
If no treatment plan is available and the customer is conscious, give the customer moral support	First, the personnel member must ensure that no viable treatment plan can be reached. Then, he or she should participate in offering moral support to the customer in order to boost his or her spirits until the medical teams arrive	This task is not critical but is nonetheless important because the a customer should be offered as much support as possible during a medical emergency	15 minutes (medical personnel could take anywhere from 5-15 minutes to arrive)

Table C-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Help Customer Who is Having a Medical Emergency"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Detect, perceive, and determine the specific type of injuries the customers have sustained	-Cognitive: 3.9/5* -Physical: Low -Overlap of task requirements: Parallel	At least 2	At least one personnel member should understand english so that he or she can quickly respond to a customer's cry for help or description of injuries. In addition, at least one personnel member should have basic medical knowledge and strong situational awareness so that he or she can identify and determine the various injuries which customers have sustained.
If injuries were identified, come up with and implement a treatment plan with the help of qualified personnel or customers	-Cognitive: 3.9/5* -Physical: Medium (depends on treatment plan) -Overlap of task requirements: Serial	At least 2	At least one of the personnel members should know English so that he or she can discuss potential treatment options with the other personnel and customers. All personnel members present should also have medical experience or

			training so that they can come up with an effective treatment plan. Finally, one personnel member (or customer) should also know the language that the debilitated customer speaks so that the customer can be notified of the treatment plan before it proceeds (if the customer is conscious).
Detect and perceive a medical emergency in the store	-Cognitive: 1.4/5 -Physical: Low -Overlap of task requirements: Usually parallel with a routine task	At least 2	At least one of the personnel members needs sufficient situational awareness so that he or she can identify that there is a problem.
Call for help from other personnel members and customers and try to identify the specific health problem	-Cognitive: 3.0/5* -Physical: Low -Overlap of task requirements: Parallel	At least 2	At least one of the personnel members should know English so that he or she can call for help. It would also be optimal for at least one of the personnel to have basic medical knowledge so that he or she can act as a leader when diagnosing the problem.
Call 911 and relay the information about the medical emergency to the dispatcher	-Cognitive: 3.6/5 -Physical: Low -Overlap of task requirements: Parallel	At least 2	The personnel member who is making the call should know English so that he or she can effectively communicate with the dispatcher. This personnel member should also have strong situational awareness and should understand the medical problem so that he or she can relay accurate information to the dispatcher
Come up with a treatment plan and implement the	-Cognitive: 3.0/5* -Physical: Medium (depends on the	At least 2	At least one of the personnel members should know English so

treatment plan with qualified personnel members and customers	treatment plan) -Overlap of task requirements: Serial		that he or she can discuss potential treatment options with the other personnel and customers. All personnel members present should also have medical experience or training so that they can come up with an effective treatment plan. Finally, one personnel member (or customer) should also know the language that the debilitated customer speaks so that the customer can be notified of the treatment plan before it proceeds (if the customer is conscious)
If no treatment plan is available and the customer is conscious, give the customer moral support	-Cognitive: 3.4/5 -Physical: Low -Overlap of task requirements: Serial	At least 2	At least one of the personnel members (or customers) should know the language that the debilitated customer speaks so that he or she can console the customer. This personnel member (or customer) should also be able to say things which would boost the spirits of the debilitated customer.

Section C.5: Questionnaire for Function “Help Customer Who is Having a Medical Emergency”

Method Used: Talk Through-Walk Through

Manager:

-How do you think the volunteers and other customers would react to a customer who is having a medical emergency?

The customers would show their concern verbally and would call for help. A volunteer would probably call 911.

-How hard is it to monitor every customer in the store at once? What are some factors that may make it hard to tell that a medical emergency is taking place?

It is nearly impossible because there is a constant flow of customers into and out of the store. One factor which would make it hard to tell that a medical emergency is taking place is a lack of communication skills on behalf of a customer because he or she might not know English or might not be able to speak.

-Is it possible for customers to receive injuries from items in the store? If so, how?

It is possible for customers to receive injuries from items in the store because they could trip over items which are frequently dropped by customers. It is also impossible to determine what kinds of items enter the store so some of them could be sharp or dangerous.

-Do you have a procedure or plan that you follow when you realize that a customer is having a medical emergency? If so, what are the steps that you follow?

There is no established procedure or plan the he follows when there is a medical emergency. The kind of response plan developed is contingent on the severity of the emergency, and 911 is called if the medical problem is severe enough.

-If you and others in the store had to develop a treatment plan, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you and others in the store had to develop a treatment plan, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Very intense

-If you do not follow a plan, what are the actions you immediately take?

He assesses the situation, administers first aid if it is warranted, and calls 911

-If a customer is having a medical emergency, would you permit other customers in the store to help?

He would not permit others in the store to help unless they are a medical professional.

-Who decides upon the plan of action and where do they do that?

The manager decides on plan of action within the store.

-Are you and the other volunteers trained so that you can diagnose a medical problem that a customer is having and then deliver first aid?

Most of the volunteers are not trained so that they can diagnose a medical problem and deliver first aid. The manager is trained so that he can accomplish these actions.

-Do you have the final say as to what the plan will be?

The manager does have the final say.

-What factors might lead to the wrong decision?

One factor which might lead to the wrong decision is a lack of communication skills on behalf of the victim. Another factor is forgetfulness due to dementia or another medical condition which may make it hard for the customer to convey his or her symptoms to the personnel member.

-How many phones are located in the store? Are the batteries for the phones replaced regularly?

There 3 landline phones in the store, all of which are charged and recharged with charging ports

-How many first aid kits do you have in the building? Do you make sure that they contain all necessary equipment for an emergency?

There is one first aid kit in the building and the manager ensures that it contains all necessary equipment for an emergency.

-What factors may make it hard to deliver first aid or help a customer who is hurt?

One factor is that there could lack of communication between the customer and the personnel member. The customer could also be unconscious which would make it harder to deliver first aid or administer a treatment plan.

-What are some examples of health-related emergencies that customers have had in the store?

Have you kept records of these emergencies?

Some customers have had low blood sugar, high blood pressure, cardiac failure (passed out in bathroom), and one or two have hurt themselves by tripping on something inside the store. He does not keep records of the emergencies.

-Have there been any cases where you or the other personnel did not know what to do in response to a medical emergency?

There have been no instances where this was the case.

-What would you and the other personnel do if no treatment plan can be developed? Would you offer moral support until a medical crew arrived?

They would offer moral support.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when identifying and treating a customer's medical condition?

1

-About how much time would it take you to identify and treat a customer's medical condition?

It would be spontaneous and would depend on the medical condition.

Volunteer 1:

-What are the different tasks that you perform in the store? About how much time do you spend on your tasks?

She prices, determines what gets transferred to the boutique, acts as the cashier when one is needed, receives donations, and organizes and cleans the store.

-Where are your workstations? Can you easily see the customers from your workstations?
Her workstations are throughout the store and it can sometimes be difficult for her to view the customers from her workstations.

-What are some things that might distract you or make it hard for you to identify that a customer is having a medical emergency?
Poor lines of sight due to the locations of some of her workstations may make it hard for her to identify a customer who is having a medical emergency.

-If you observe a customer having a medical emergency, is there a plan you should follow? Is it on paper or do you remember it?
She is not aware of a plan of this nature.

-What would you do when you detect that a customer is having a medical emergency?
She would approach the customer and determine if anything can be done. She would also call 911 for help.

-Are you aware of any first aid kits or medical equipment in the building?
She is aware of the first aid kit.

-Have you received training regarding what you should do when confronted by someone having a medical emergency? If so, are you retrained on a continuous basis?
She received CPR training as an adult and was retrained on a continuous basis. However, she no longer receives CPR training.

-When there is a medical emergency, do you eventually meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?
She would call the manager and other volunteers for help. They would meet near the customer and the manager would have authority.

-What factors might result in an unsatisfactory plan or decision?
There are none which she can think of.

-What are some factors in the store that may impede the implementation of a plan of action? How will they impede it?
One factor could be language because the debilitated customer may not be able to communicate his or her reaction to the treatment plan. Other factors that could impede the implementation of a plan are if the customer has no health insurance or is undocumented. This is because the customer may not want the personnel members to be aware of his status and thus might resist their help.

-What would you and the other personnel do if no treatment plan can be developed? Would you offer moral support until a medical crew arrived?
They would offer moral support.

-If you and others in the store had to develop a treatment plan, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Moderate

-If you and others in the store had to develop a treatment plan, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Moderate

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when identifying and treating a customer's medical condition?

1

-About how much time would it take you to identify and treat a customer's medical condition?
It depends on the condition but it would probably take her around 10 minutes

Volunteer 2:

-What are the different tasks that you perform in the store? About how much time do you spend on your tasks?

She spends most of her time sorting and organizing inventory and creates the window display. She spends about 3.5 hours on all of her tasks.

-Where are your workstations? Can you easily see the customers from your workstations?
Most of her workstations are in the back of the store so she can only sometimes see customers.

-What are some things that might distract you or make it hard for you to identify that a customer is having a medical emergency?

One factor that could distract her or make it hard for her to identify that a customer is having a medical emergency is that racks or bulk merchandise could be blocking her line of sight. Also, she could be working in the back and fail to detect that a customer is having a medical emergency.

-If you observe a customer having a medical emergency, is there a plan you should follow? Is it on paper or do you remember it?

She is not aware of a plan but would call 911.

-What would you do when you detect that a customer is having a medical emergency?

She would immediately call 911 and describe the emergency to the dispatcher.

-Are you aware of any first aid kits or medical equipment in the building?

She is not aware of any first aid kits or medical equipment.

-Have you received training regarding what you should do when confronted by someone having a medical emergency? If so, are you retrained on a continuous basis?

She received CPR training as a science teacher but no longer receives training.

-When there is a medical emergency, do you eventually meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?

She would call the manager, who has the authority to make the final decision, near the customer but would not meet with the other volunteers before she calls 911.

-What factors might result in an unsatisfactory plan or decision?

She cannot think of any.

-What are some factors in the store that may impede the implementation of a plan of action?
How will they impede it?

One is clothing, which could make it hard to treat a customer's wounds or medical condition. Another is a small space, which could raise one's stress level and impede mobility. A lack of supplies, such as a defibrillator, could also impede the implementation of a plan of action depending on the type of medical condition that is afflicting the customer.

-What would you and the other personnel do if no treatment plan can be developed? Would you offer moral support until a medical crew arrived?
They would offer support in any way they could.

-If you and others in the store had to develop a treatment plan, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Moderate

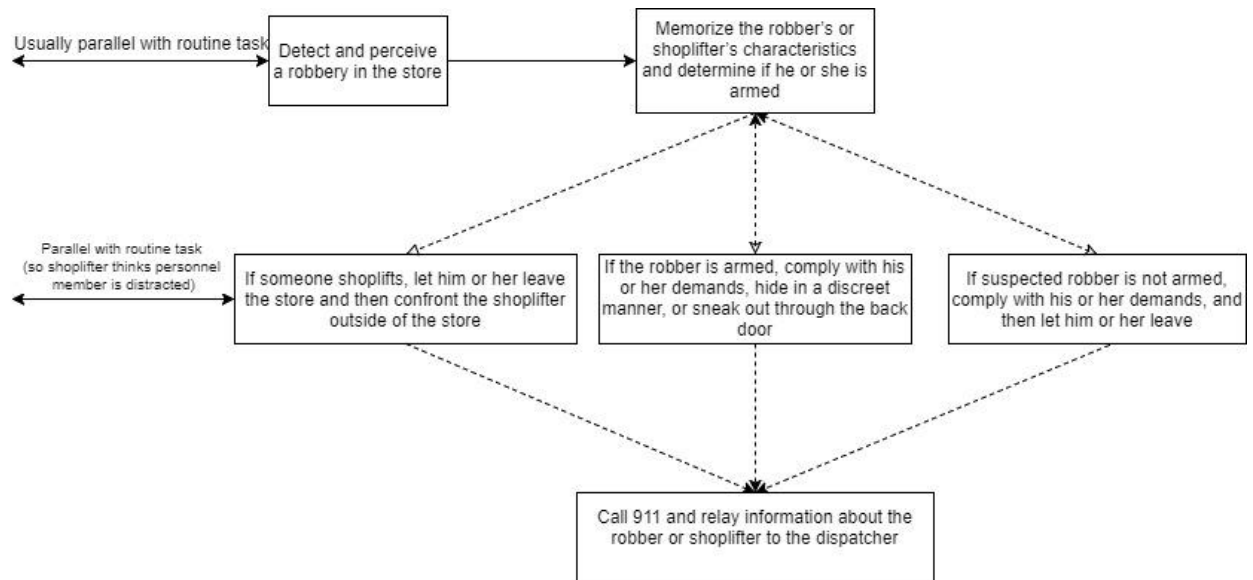
-If you and others in the store had to develop a treatment plan, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
Moderate to high

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when identifying and treating a customer's medical condition?
3

-About how much time would it take you to identify and treat a customer's medical condition?
It depends on the condition but it would probably take her minutes.

Appendix D: Safety Function - Identify and Respond to a Robbery

Section D.1: Task Diagram for Function “Identify and Respond to a Robbery”



- Shaded Arrow: Linear Relationship
- Unshaded Arrow: Conditional Relationship
- ↔ Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- - - Dotted Stem: Usually a coordinated effort

Section D.2: FRA for Function “Identify and Respond to a Robbery”

Table D-1: FRA - Processes, Systems, and Components/Human Actions for Function “Identify and Respond to a Robbery”

Processes	Systems	Components/HAs
-People identifying and responding to a robbery	-Volunteers and the manager who can identify and respond to a robbery -Customers who can identify and respond to a robbery -Detect robbery -Respond to robbery	-Visual or auditory acknowledgement of a robbery -Make an attempt to identify the facial features or characteristics of the robber and determine if he or she is armed -Respond to the robbery in a way that accounts for the severity of the robbery -3 landline phones for calling 911 -1 first aid kit -Firearms/weapons

Table D-2: FRA - Purpose and Conditions Indicating Need and Availability for Function “Identify and Respond to a Robbery”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To ensure customer safety (safety function)	-While the crime rate in the area has gone down recently, petty crimes including shoplifting are still common -Because the store accepts a wide variety of merchandise, valuable merchandise which attracts robbers can sometimes be found in the store	-The batteries in the phones are frequently replaced -There are at least 2 personnel present

Table D-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function “Identify and Respond to a Robbery”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
-The personnel member identifies the robber or shoplifter or is notified of the robber or shoplifter by a customer -The personnel member analyzes the features of the robber/shoplifter before he or she leaves -Then, the personnel member calls 911 and conveys relevant information	-The robber or shoplifter was successfully identified -The characteristics of the robber or shoplifter were memorized -The police were called via 911 and the situation was described in detail -The robber or shoplifter was approached and questioned if he or she was unarmed -Customers were told to be	-The police and other personnel can be notified if the robbery was a false alarm -If a customer was perceived as a robber or forgot to pay -If the shoplifter/robber returns the stolen items

-If the robber demands money from the cash register, the cashier should willingly hand over the money to avoid harm -Depending on whether the robber is armed, the personnel member should either approach him or her and request that the stolen items be returned, or should quietly tell customers to hide and stay calm	quiet and hide if the robber was armed	
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Section D.3: FA for Function “Identify and Respond to a Robbery”

Table D-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Identify and Respond to a Robbery”

Current allocation	Optimal allocation
<i>Manual Control:</i> When the store is open, it is up to the personnel present to identify and respond to a robbery. The response will usually entail giving the robber what he or she wants and then calling the police afterwards. There is no automatic detection system in the store so this function is predicated on manual control.	<i>Manual control during store hours and fully automatic control when store is closed:</i> When the store is open, it is hard to distinguish between a regular customer and a shoplifter/robber. Thus, an automatic system that could identify and respond to a shoplifter/robber would be nearly impossible to program and would definitely not be a cost effective option. Plus, an automatic system could cause the robber to panic and potentially harm customers or volunteers. When the store is closed, an automatic system that detects and notifies relevant personnel about a robbery should be active. With this system, the police and the manager will be able to identify if a robbery is taking place and will be able to respond quickly. This system should be checked routinely by personnel to ensure that it functions correctly.

Section D.4: Task Analysis for Function “Identify and Respond to a Robbery”

Table D-5: Task Analysis - Human Actions and Tasks for Function “Identify and Respond to a Robbery”

Human Actions	Tasks
-Visual or auditory acknowledgement of a robbery -Make an attempt to identify the facial features or characteristics of the robber and determine if he or she is armed -Respond to the robbery in a way that accounts for the severity and nature of the robbery	-Detect and perceive a robbery in the store -Memorize the robber’s or shoplifter’s characteristics and determine if he or she is armed -If the robber is armed, comply with his or her demands, hide in the back room, or sneak out through the back door -If suspected robber is not armed, comply with his or her demands and let him or her leave -If someone shoplifts, let him or her leave the store and then call the police

	outside of the store -Call 911 and relay information about the robber or shoplifter to
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Table D-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function "Identify and Respond to a Robbery"

Task	Decision-making	Response	Teamwork/Communication
Detect and perceive a robbery in the store	<ul style="list-style-type: none"> -Probabilistic -The personnel member may have to determine the odds that a robbery occurred -Absolute if the personnel member is notified of the robbery 	<ul style="list-style-type: none"> -Look for cues which indicate that someone has robbed the store (ie. the robber looks nervous, looks like he or she is concealing something, or a customer witnessed the robbery and tells the personnel member about it) -Determine what was stolen and when it was stolen based on visual cues or witness testimony -Infrequent task; high accuracy is required if the robber is to be identified and subsequently caught -Task is time critical because the personnel member must identify the robber before he or she exits the store -The task should be completed while standing so that a line of sight to the robber can be established -No biomechanics are required other than standing and walking towards the suspected robber 	<ul style="list-style-type: none"> -Teamwork and communication are not required during this task unless the personnel member communicates with a customer who is disclosing information about the robbery
Memorize the robber's or shoplifter's characteristics and determine if he or she is armed	<ul style="list-style-type: none"> -Absolute -The personnel member either memorizes the robber's characteristics and determines if he or she is armed or does not 	<ul style="list-style-type: none"> -Glance at the robber and take a mental snapshot of what the robber looks like -Identify any distinct characteristics that the robber has -While glancing at the robber, try to determine whether the robber is armed -If he or she is armed, try to determine the type of weapon he or she is carrying -Infrequent task; enough accuracy is required so that it can be determined if the robber is armed (so that an appropriate response plan can be developed) -Task is time critical because the robber may leave or may start attacking customers if his or her characteristics cannot be identified fast enough -The task should be completed while standing so that a line of sight to the 	<ul style="list-style-type: none"> -Teamwork and communication do not apply to this task as it is an individual task

		robber can be established -No biomechanics are required other than walking closer to the robber in order to have a better view of him or her	
If the robber is armed, comply with his or her demands, hide in a discreet manner, or sneak out through the back door	-Relative -The personnel member must evaluate his or her position relative to the robber before responding	-If the personnel member's workstation is in the front of the store or at the cash register, comply with the robber's demands -Be as quiet and as compliant as possible so as not to anger the robber -The specific actions required depend on the demands of the robber, but the personnel member should be expected to open the cash register and hand the money to the robber -If the personnel member is not running the cash register, he or she should hide and not draw attention -If the personnel member is in the back of the store and is not in the line of sight of the robber, he or she should sneak out through the back door and call the police -Very infrequent task (no reported armed robberies); near perfect accuracy is required so that the robber does not feel like the personnel member is not complying -Time critical task as stalling, working slowly, or drawing anger to oneself could cause the robber to attack -The personnel member should be standing if he or she is in the back or is confronted by the robber, and should be lying down if he or she is hiding in the store -The biomechanics required depend on the demands of the robber and where one's workstation is at the time of the robbery. For example, the personnel members that the robber can see should put their arms over their heads.	-Teamwork is only required if the robber wants all of the personnel to be involved in fulfilling his or her demands -Communication is required between the confronted personnel member and the robber so that the personnel member can fulfill the robber's demands without confusion
If suspected robber is not armed, comply with his or her demands,	-Absolute -The personnel member either complies with the robber's demands and	-If the personnel member is confronted by the robber, he or she should comply with the robber's demands -If the personnel member is not confronted by the robber, he or she should stay quiet and should not attack	-Teamwork is only required if the robber wants all of the personnel to be involved in

and then let him or her leave	lets he or she leave or does not	<p>the robber</p> <ul style="list-style-type: none"> -After the robber's demands have been fulfilled, the personnel should let him or her leave and should call the police afterwards -Very infrequent task; enough accuracy is required so that the robber is satisfied and does not attack anyone -Time critical task because the robber's demands should be fulfilled quickly in order to avoid violence -This task should be completed while standing -The biomechanics will include handling money or merchandise to the robber (force required depends on the weight of the merchandise) and will also include moving one's jaw in order to communicate with the robber 	<p>fulfilling his or her demands</p> <ul style="list-style-type: none"> -Communication is required between the confronted personnel member and the robber so that the personnel member can fulfill the robber's demands without confusion
If someone shoplifts, let him or her leave the store and then confront the shoplifter outside of the store	<ul style="list-style-type: none"> -Absolute -The personnel member either lets the shoplifter leave and then confronts him or her or does not 	<ul style="list-style-type: none"> -When a shoplifter is identified, act natural and do not approach the shoplifter -Let the shoplifter take the merchandise out of the store -Confront the shoplifter outside of the store and call the police -Infrequent task (multiple cases of shoplifting); enough accuracy is required so that the shoplifter is unaware that he or she is being tracked -Task is not time critical and time depends on how much time the shoplifter spends in the store before leaving -The task should be completed while standing so the shoplifter can be monitored -No biomechanics are required other than intermittently turning towards the shoplifter and walking towards the shoplifter when he or she leaves the store 	<ul style="list-style-type: none"> -No teamwork and communication are required for this task -If the manager or other personnel members are present, then the personnel member could notify them of the shoplifter but this is not essential
Call 911 and relay information about the robber or shoplifter to	<ul style="list-style-type: none"> -Absolute -The personnel member either calls 911 and relays all information 	<ul style="list-style-type: none"> -If the robber is outside of sight and hearing range or has left, call 911 -Call 911 if the shoplifter refuses to return the items he or she stole -Give the dispatcher an idea of what the robber looks like, what he or she stole, 	<ul style="list-style-type: none"> -No teamwork is required for this task -Communication is critical because the personnel

the dispatcher	about the robber or shoplifter or does not	<p>whether he or she is armed, and where the store is located. All important details should be conveyed to the dispatcher.</p> <ul style="list-style-type: none"> -Infrequent task; enough accuracy is required so that the police become aware of the location of the store and of the severity of the robbery. -Time critical task because the police will have more time to find and arrest the robber if they are notified early -This task should be completed while standing -No biomechanics are required other than raising a phone with a small amount of force, dialing 911, and moving one's jaw in order to talk with the dispatcher 	member needs to be able to communicate the situation to the dispatcher so that an appropriate response can be executed
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Table D-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function "Identify and Respond to a Robbery"

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Detect and perceive a robbery in the store	N/A	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level depends on how many people are in the store at once 	<ul style="list-style-type: none"> -A lack of situational awareness due to fatigue, distractions, or limited sight could hinder this task and make it hard to detect a robbery -Shoplifters usually conceal the items they stole and this would make it hard to detect that they robbed the store -Reduced staffing could also hinder this task because if the store is sparsely populated by personnel, it would be harder to detect a robbery 	<ul style="list-style-type: none"> -Medium potential for injury -The robber could be armed in which case the firearm or weapon is a significant hazard -Distance should be maintained so that the robber does not feel threatened
Memorize the robber's or	N/A	<ul style="list-style-type: none"> -There is no established 	<ul style="list-style-type: none"> -Panic is a factor which could hinder 	<ul style="list-style-type: none"> -Medium potential for

shoplifter's characteristics and determine if he or she is armed		worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level may be lower if personnel and customers realize that a robber is present	this task because panic can impair working memory, which is needed for this task	personal injury -The robber could be armed in which case the firearm or weapon is a significant hazard -Distance should be maintained so that the robber does not feel threatened
If the robber is armed, comply with his or her demands, hide in a discreet manner, or sneak out through the back door	-1 baseball bat is located near the cash register and can be used if the robber attacks	-There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level should be low if the customers are aware of the armed robber	-Panic is a factor which could hinder this task because if the personnel panic, they could anger the robber -Stress due to time pressure is another factor and strongly applies to the personnel member who has to fulfill the robber's demands because he or she cannot keep the robber waiting -A language barrier between the personnel member and shoplifter could make it hard to comply with the robber's demands	-High potential for personal injury -The robber and the weapon he or she possesses are very hazardous -If the personnel member is not careful, the armed robber could use the weapon to kill the personnel member and others present
If suspected robber is not armed, comply with his or her demands, and then let him or her leave	-1 baseball bat is located near the cash register and can be used if the robber attacks	-There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set	-Panic is a factor which could hinder this task because if the personnel panic, they could anger the robber -Stress due to time pressure is another	-High potential for personal injury -The robber, despite not carrying a weapon, is

		<p>at comfortable levels</p> <p>-The noise level should be low if the customers are aware of the robber</p>	<p>factor and strongly applies to the personnel member who has to fulfill the robber's demands because he or she cannot keep the robber waiting</p> <p>-A language barrier between the personnel member and shoplifter could make it hard to fulfill the robber's demands</p>	<p>still a hazard and can physically harm volunteers or customers</p> <p>-Furthermore, the robber could be concealing a weapon which the personnel members might not be able to see</p>
<p>If someone shoplifts, let him or her leave the store and then confront the shoplifter outside of the store</p>	<p>-1 baseball bat is located near the cash register and can be used if the robber attacks</p>	<p>-There is no established worksite for this task</p> <p>-This task will occur in the store, so the temperature and lighting are set at comfortable levels</p> <p>-The noise level depends on the number of personnel and customers in the store</p>	<p>-Panic is a factor which could hinder this task because if the personnel member who detects the shoplifter panics, it would be harder for him or her to not attract the attention of the shoplifter</p> <p>-A language barrier between the personnel member and shoplifter could make it hard to confront the shoplifter effectively</p>	<p>-Medium potential for personal injury because the shoplifter could attack when he or she is confronted by the personnel member</p>
<p>Call 911 and relay information about the robber or shoplifter to the dispatcher</p>	<p>-3 landline phones in different areas of the store can be used during this task</p>	<p>-This task could either occur inside of the store once the robber/shoplifter leaves, or outside of the back exit</p> <p>-Many egress and ingress paths could be blocked if the robber is still in the store because the personnel member needs to avoid the robber's line of</p>	<p>-Panic is a factor which could hinder this task because it could hamper one's ability to convey the characteristics of the robber and the severity of the robbery to the dispatcher</p> <p>-Time pressure is another factor that could make this task more challenging because the</p>	<p>-Medium potential for personal injury</p> <p>-If the robber is aware of the personnel member who is calling 911, he or she could be attacked</p>

		sight -The lighting and noise levels should be moderate as the store is only open during the day and is rarely crowded -Temperature depends on the time of year	personnel would want the robber to be arrested as soon as possible so that the stolen items can be returned	
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Table D-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function "Identify and Respond to a Robbery"

Task	Narrative of Activities	Applicability	Time Required
Detect and perceive a robbery in the store	First, the personnel member should acknowledge either a visual or auditory cue which indicates that a robbery is underway or has already happened (visual cue includes testimony from a customer). Then, the personnel member should assess what has been stolen and whether any damage was caused.	This task is needed so that a robbery, which could result in physical harm towards the customers and a loss of profits, can be addressed	20 minutes (the robber or shoplifter may conceal the items he or she is stealing)
Memorize the robber's or shoplifter's characteristics and determine if he or she is armed	The personnel member should walk close enough to the robber so that he or she can easily see the robber. Then, the personnel member should memorize distinguishing facial features or clothing if the robber has a mask. While doing this, the personnel member should also determine if the robber is armed and should determine what kind of weapon the robber possesses.	This task is important so that the police will be able to track the robber and hopefully recover stolen goods, and also so that an appropriate response plan can be developed	30 seconds (the robber could be concealing his or her firearm)
If the robber is armed, comply with his or her demands, hide in a discreet	If the personnel member is approached by the armed robber at the cash register or at any other area in the store, he or she should be as	This task is structured so that the risk of angering the armed robber and causing him or	3 hours (the robber could take customers and personnel hostage and a police standoff could occur)

manner, or sneak out through the back door	submissive as possible and should comply with the robber's demands (unless they cause bodily harm). If the personnel member is in the store area but is not confronted by the robber, he or she should drop down onto the floor and should be as quiet and as still as possible. Finally, if the personnel member is in the back of the store and is not in the line of sight of the robber, he or she should quietly take a phone, go through the back door, and should proceed to call the police.	her to shoot is minimized. Thus, it is important in that it can prevent personnel members and customers from being shot.	
If suspected robber is not armed, comply with his or her demands, and then let him or her leave	If the personnel member is approached by the robber, he or she should remain calm and comply with the robber's demands. If the personnel member is not confronted by the robber, he or she should be quiet and should not attract attention. Once the robber's demands are fulfilled, the personnel members should let the robber exit the store. The personnel members should not attack the robber because he or she may be skilled in combat or may be concealing a weapon. After the robber leaves, one of the personnel members should call 911 and should describe the characteristics of the robber to the police.	This task is important because it helps ensure the safety of the customers and personnel when an unarmed robbery occurs.	20 minutes (the robber will probably leave within 20 minutes from entering the store)
If someone shoplifts, let him or her leave the store and then confront the shoplifter	When the personnel member detects the shoplifter, he or she should not approach the shoplifter or let the shoplifter know that he or she is being monitored. Then, when the shoplifter exits the store	This task is important because if the personnel allow the shoplifter to leave without confronting him or her first, the store	20 minutes (the shoplifter will probably leave within 20 minutes from entering the store)

outside of the store	without paying for the merchandise, the personnel member should approach the shoplifter and tell the shoplifter that he or she forgot to pay. If the shoplifter returns the items, the police should not be called. If the shoplifter refuses to return the merchandise and subsequently leaves, the police should be notified and a description of the shoplifter should be given. The reason for confronting the shoplifter outside of the store rather than inside of the store is that the shoplifter can only be charged with shoplifting (petty theft) if he or she passes all points of sale.	could lose valuable merchandise which would result in a loss of profits.	
Call 911 and relay information about the robber or shoplifter to the dispatcher	If an armed or aggressive robber enters the store and one or more personnel members are near the back exit, they should leave through the back exit and call 911. Also, if the robber or shoplifter leaves the store, then one of the personnel members should call 911. The personnel member who calls 911 should describe the situation in detail and should describe the distinct features of the robber.	If the robber is armed, this step is necessary because the police could stop the robber from causing serious harm. If the robber or shoplifter leaves the store, then this step is necessary so that the stolen items can be recovered by the police and so that the robber or shoplifter is apprehended.	3 minutes (The phone service could be low and the caller may not be able to convey the emergency quickly)

Table D-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Identify and Respond to a Robbery"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Detect and perceive a robbery in the store	-Cognitive: 1.4/5 -Physical: Low	At least 2	Knowledge of the signs of a robbery

	-Overlap of task requirements: Usually parallel with a routine task		and strong situational awareness are required for this task
Memorize the robber's or shoplifter's characteristics and determine if he or she is armed	-Cognitive: 3.8/5 -Physical: Low -Overlap of task requirements: Potentially parallel		Strong working memory and good eyesight are required for this task. The ability to keep calm would help facilitate the successful completion of this step.
If the robber is armed, comply with his or her demands, hide in a discreet manner, or sneak out through the back door	-Cognitive: 4.2/5* -Physical: Moderate (depends on the robber's demands) -Overlap of task requirements: Parallel	At least 2	The ability to stay calm is necessary during this step. In addition, at least one personnel member should be able to understand the armed robber's language or body language so that he or she can fulfill the robber's demands without confusion.
If suspected robber is not armed, comply with his or her demands, and then let him or her leave	-Cognitive: 4.1/5 -Physical: Moderate (depends on the robber's demands) -Overlap of task requirements: Parallel	At least 2	The ability to stay calm is necessary during this step. In addition, at least one personnel member should be able to understand the robber's language or body language so that he or she can fulfill the robber's demands without confusion.
If someone shoplifts, let him or her leave the store and then confront the shoplifter outside of the store	-Cognitive: 3.8/5* -Physical: Low -Overlap of task requirements: Parallel (with a routine task in the store)	At least 2	The ability to act natural and act as if nothing is wrong is needed during this step so that the shoplifter will not be aware that he or she

			is being watched. At least one personnel member should understand the language the shoplifter speaks so that the personnel member will be able to confront and communicate with the shoplifter outside of the store. The personnel member who confronts the shoplifter should also be strong enough to defend his or herself if the shoplifter attacks.
Call 911 and relay information about the robber or shoplifter to the dispatcher	<ul style="list-style-type: none"> -Cognitive: 2.3/5 -Physical: Low -Overlap of task requirements: Serial 	At least 2	The personnel member who is making the call should know english so that he or she can effectively communicate with the dispatcher. This personnel member should also have strong situational awareness and should understand the robbery or shoplifting incident so that he or she can relay accurate information to the dispatcher

Section D.5: Questionnaire for Function “Identify and Respond to a Robbery”

Method Used: Talk-Through Walk-Through

Manager:

-How do you think the volunteers and customers would react to a robbery in this store?

The volunteers and customers would panic if an armed robbery takes place. If they encountered a shoplifter, they would probably experience surprise, shock, and dismay.

5 steps for shoplifting (concealment)

-Do you have any detection systems that can tell when a robbery is taking place?

No

-What are some of the factors that may make it hard for volunteers to detect that a robbery is taking place?

The most important factor is a lack of situational awareness, which could be due to fatigue or limited sight.

-Would you try to identify the robber and try to determine what he or she stole or would you do something else before you plan your response?

He would try to see where the robber goes and would try to get some sort of identification. He would also try to determine the value of what the robber stole based on the price tag.

-If a shoplifter steals merchandise, what is your response?

He would let the shoplifter go outside, take a mental snapshot of the shoplifter, and would then tell him or her that he or she forgot to pay. He lets the shoplifter go outside because a person can only be convicted of shoplifting if he or she exits the store without paying.

-If the shoplifter is identified as a volunteer, what is your response?

He would confront the volunteer with evidence that he or she shoplifted, would ask them what he or she would do if he or she were the manager, and would then leave. In the past, many of the volunteers in this situation resigned after they were confronted about shoplifting.

-If you had to respond to a shoplifter robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to respond to a shoplifter robbery, would you say the level of confusion, risk, frustration, or anxiety is little, moderate, or high to very intense?

Little

-If an armed robber enters the store, what is your response?

He would comply with the robber's demands and would then let them escape. Afterwards, he would call 911 and give a description of the robber.

-If you had to respond to an armed robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to respond to an armed robbery, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Moderate

-Who decides upon the plan of action and where do they do that?

The manager decides upon the plan of action and decides in the position in which he becomes aware of the robbery.

-What factors might lead to the wrong decision?

The greatest factor is panic, which can cloud a person's judgement.

-What would you do if there is a language barrier between the robber and the personnel member?

He would smile and would try to read the robber's body language. He would comply with the robber's demands and would call 911 when the robber leaves. If the robber is a shoplifter, he would confront the shoplifter outside of the store and let him or her know that the police are on their way.

-Do you have firearms or other weapons in the store that can be used for defense?

No

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to a shoplifter robbery?

1

-About how much time would it take you to respond to a shoplifter robbery?

It depends on how long the shoplifter stays in the store because he would only confront the shoplifter once he or she leaves.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to an armed robbery?

1

-About how much time would it take you to respond to an armed robbery?

It would be an immediate response and the time spent interacting with the armed robber would depend on the extent of the robber's demands.

-Has the store experienced any robberies in the past? If so, do you have logs or reports about the robberies?

The store has seen multiple shoplifters who were volunteers. It has also seen a robbery where two men stole a volunteer's purse. These incidents were recorded in reports.

-Have there been any cases where you or the other volunteers failed to act when you had a plan in mind?

There have been cases where this happened. One example was when the manager wanted to stop a shoplifter but he became violent and started punching the manager. This caused the manager to back up and let him leave instead of restraining him until the police arrived.

-Have you changed anything in the store or in any procedures to account for robberies in the past? If so, how?

He has changed the way the racks are lined up so that it is harder to access valuable merchandise. He has also ticketed high quality clothing with more than one string so that it is harder for shoplifters to cut the tags off of these items. Another tactic he has implemented is putting out valuable leather and fur jackets in the summer and putting a chain on these jackets in the winter so as to dissuade robbers or shoplifters from taking them. An additional tactic is if a customer brings an item to the counter without a tag, the personnel members are told to refute the sale.

Volunteer 1 (cashier):

-What are the different tasks that you perform in the store? About how much time do you spend on your tasks?

She distributes priced items in the store, acts as the cashier, and prices some items. She spends around 3 hours on these tasks.

-What are some things that might distract you or make it hard for you to identify a robbery? One factor is that she cannot see every area of the store from her workstation and another is that she is frequently facing away from the store while helping customers check out.

-Is there a plan you should follow when a robbery occurs?

She is not aware of a plan but knows that she should give the robber what he or she wants

-Would you try to identify the robber and try to determine what he or she stole or would you do something else before you plan your response?

She would alert the manager before anything else.

-If a shoplifter steals merchandise, what is your response?

She would let the shoplifter have it if he or she wants it. Afterwards, she would call 911.

-If the shoplifter is identified as a volunteer, what is your response?

She would let the volunteer take what he or she wants and would then alert the manager.

-If you had to respond to a shoplifter robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Extensive

-If you had to respond to a shoplifter robbery, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High to very intense

-If an armed robber enters the store, what is your response?

She would scream and would be frightened. She would comply with the robber's demands and would give him or her everything he or she wants.

-If you had to respond to an armed robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Extensive

-If you had to respond to an armed robbery, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High to very intense

-Are you aware of the locations of any firearms or other weapons in the store?

She is aware of the locations of items, such as baseball bats and steel rebar, that can be used as weapons.

-Have you received training regarding what you should do when confronted by an attacker or robber? If so, are you retrained on a continuous basis?

She was trained and retrained in her previous job but no longer receives training.

-If someone shoplifts, would you meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?

She would not meet with the other volunteers and manager because she would let the manager handle the situation.

-What factors might result in an unsatisfactory response?

One factor is that the robber might lash out at the personnel remember which would impede the response plan. Also, panic over the safety of the customers and oneself could lead to clouded judgement and an unsatisfactory response.

-How problematic do you think a language barrier between the robber or shoplifter and the volunteers will be?

She would not have a problem because she speaks Spanish but would not be able to understand and comply with the robber's or shoplifter's demands if he or she spoke a language other than Spanish and English.

-What are some factors in this store that may impede the implementation of a response to a robbery? How will they impede it?

One factor is that one's light of sight can be blocked if he or she has a workstation in the back or in an area without much traffic, and this could make it hard to confront the robber or effectively respond to whatever is happening. Another factor is that the robber could confront a personnel member and stop him or her from coming up with a response plan. Also, if the response plan includes escape, another factor would be merchandise or other items blocking the escape routes.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to a shoplifter robbery?

3

-About how much time would it take you to respond to a shoplifter robbery?

She would probably not respond at all and would let the manager handle the situation.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to an armed robbery?

5

-About how much time would it take you to respond to an armed robbery?

She would respond immediately if she acts as the cashier.

Volunteer 2:

-What are the different tasks that you perform in the store? About how much time do you spend on your tasks?

She prices, sorts, and sometimes runs the cash register. She spends a 3.5 hour shift on these tasks.

-What are some things that might distract you or make it hard for you to identify a robbery?

One factor is that some shoplifters conceal what they are stealing which makes it hard for her to detect that a robbery is taking place. Another factor is that some of her workstations are in the back of the store which means she cannot easily view the customers in the store and cannot tell if someone is stealing an item.

-Is there a plan you should follow when a robbery occurs?

She is not aware of this kind of plan.

-Would you try to identify the robber and try to determine what he or she stole or would you do something else before you plan your response?

She would try to identify the robber.

-If a shoplifter steals merchandise, what is your response?

She would call the manager.

-If the shoplifter is identified as a volunteer, what is your response?

She would be surprised and would confront the volunteer if he or she is a friend. She would speak to the manager if she was not acquainted with the volunteer.

-If you had to respond to a shoplifter robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Extensive

-If you had to respond to a shoplifter robbery, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High to very intense

-If an armed robber enters the store, what is your response?

She would be shocked and would then leave the store through the back exit if she was currently pricing or sorting in the back area. Afterwards, she would call 911.

-If you had to respond to an armed robbery, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Extensive

-If you had to respond to an armed robbery, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

High

-Are you aware of the locations of any firearms or other weapons in the store?

She is not aware of the locations of any firearms or weapons.

-Have you received training regarding what you should do when confronted by an attacker or robber? If so, are you retrained on a continuous basis?

She has not received training of this kind.

-If someone shoplifts, would you meet with the other volunteers and the manager to discuss a plan of action? If so, where do you meet and who has the authority to make the final decision?
Yes, she would meet with the other volunteers and the manager meet in the back area. The manager has the authority to make the final decision.

-What factors might result in an unsatisfactory response?

Panic is one factor which might result in an unsatisfactory response. Uncertainty as to whether the response will succeed is another factor which might result in an unsatisfactory response.

-How problematic do you think a language barrier between the robber or shoplifter and the volunteers will be?

She thinks that it could be problematic.

-What are some factors in this store that may impede the implementation of a response to a robbery? How will they impede it?

Violence on behalf of the robber could impede the implementation of a response plan because it could cause the personnel member to panic and make mistakes.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to a shoplifter robbery?

5

-About how much time would it take you to respond to a shoplifter robbery?

It would take her around 5 minutes to respond.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when responding to an armed robbery?

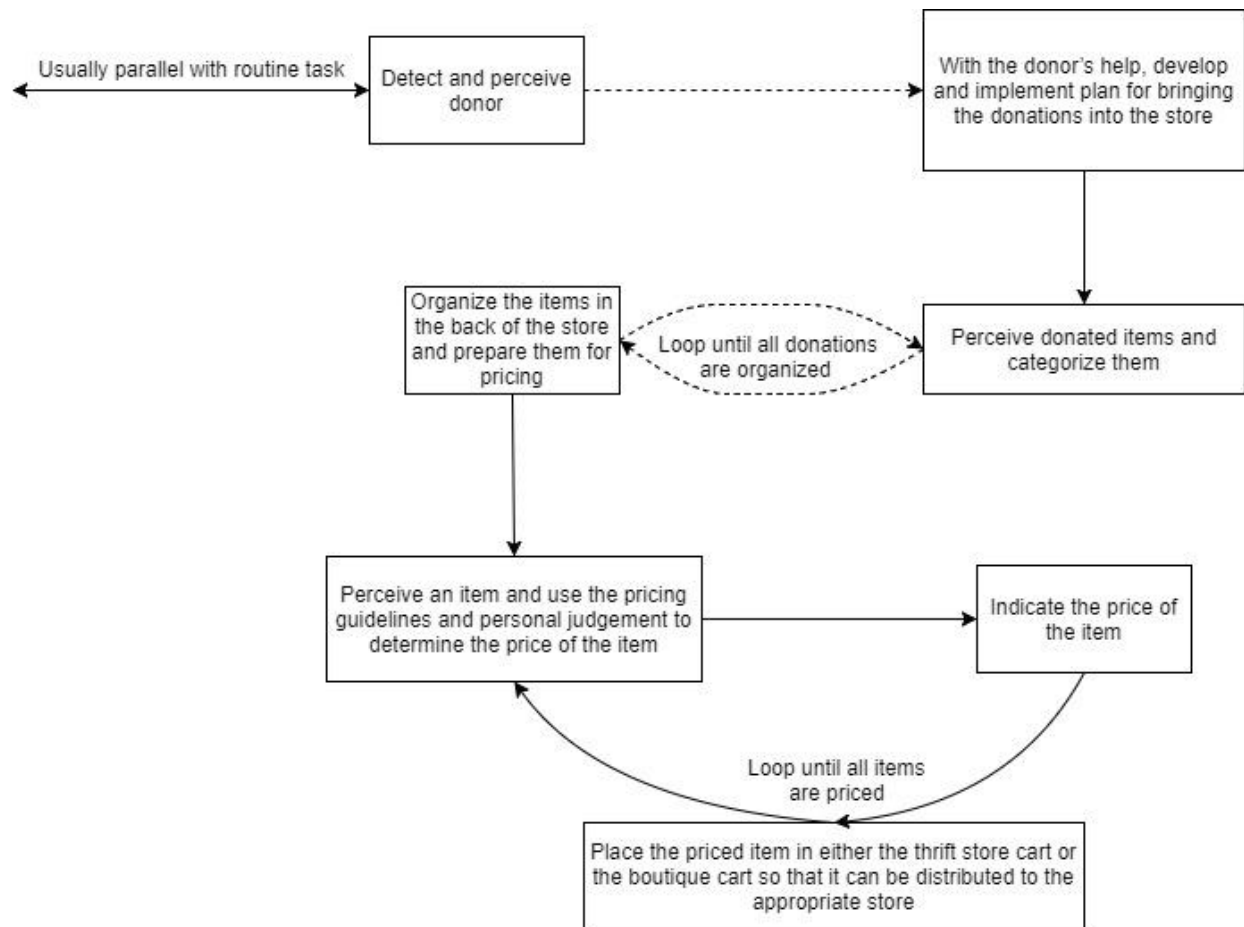
5

-About how much time would it take you to respond to an armed robbery?

She would respond immediately to an armed robbery.

Appendix E: Routine Function - Receive and Price Merchandise

Section E.1: Task Diagram for Function “Receive and Price Merchandise”



- Shaded Arrow: Linear Relationship
- Unshaded Arrow: Conditional Relationship
- ↔ Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- - - Dotted Stem: Usually a coordinated effort

Section E.2: FRA for Function “Receive and Price Merchandise”

Table E-1: FRA - Processes, Systems, and Components/Human Actions for Function “Receive and Price Merchandise”

Processes	Systems	Components/HAs
<ul style="list-style-type: none"> -Store personnel receiving and pricing merchandise -Input of merchandise by donors 	<ul style="list-style-type: none"> -Volunteers and the manager who can receive and price merchandise -Reception of merchandise -Pricing of merchandise 	<ul style="list-style-type: none"> -help donor bring merchandise into store -help store merchandise in back of store -determine price of each item -attach a price tag with determined price to each item -prepare the item for distribution -2 carts which can haul merchandise -donation receipts -ticketing guns -sharpies/pens -pricing labels of various colors -masking tape -stickers -hand carts -flatbed carts

Table E-2: FRA - Purpose and Conditions Indicating Need and Availability for Function “Receive and Price Merchandise”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To generate a profit (routine function)	<ul style="list-style-type: none"> -Donors are sometimes unable to carry heavy merchandise into store -Donors are sometimes confused as to where they should bring their donated items -If an item is not priced, it cannot be displayed in the store without causing confusion 	<ul style="list-style-type: none"> -There are at least 2 personnel present

Table E-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function “Receive and Price Merchandise”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
<ul style="list-style-type: none"> -A volunteer helps a donor bring merchandise into the storage area in the back of the store -A volunteer is stationed at 	<ul style="list-style-type: none"> -The donors have no complaints about the donation process -All donated items are appropriately priced and 	<ul style="list-style-type: none"> -The volunteers can be notified that they should stop accepting donated items or pricing items -If the store and storage

the pricing merchandise and prices merchandise -The volunteer at the cashier gives a donation receipt to the donor	placed in the cart in a timely manner	areas in the back run out of space for incoming merchandise -If an emergency occurs in the store
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Section E.3: FA for Function “Receive and Price Merchandise”

Table E-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Receive and Price Merchandise”

Current allocation	Optimal allocation
<i>Manual control:</i> Inexperienced and experienced volunteers are tasked with transferring merchandise into the store, and experienced volunteers and the manager are tasked with pricing the merchandise. Even though these tasks are performed by personnel, various tools facilitate the completion of each task.	<i>Manual control:</i> The personnel should continue to be tasked with h carry their items into the store. This is because it would not be cost have a machine do this job. Furthermore, the carts in the store can transfer of heavy merchandise. The task of pricing the incoming me should be allocated to personnel because determining the approxin each item depends on many factors which an inexpensive machine able to consider, such as the condition of the product and the usab product. Attaching price tags to merchandise should be allocated to because an inexpensive machine would not be able to determine th for the tag.

Section E-4: Task Analysis for Function “Receive and Price Merchandise”

Table E-5: Task Analysis - Human Actions and Tasks for Function “Receive and Price Merchandise”

Human Actions	Tasks
-help donor bring merchandise into store -help store merchandise in back of store -determine price of each item -attach a price tag with determined price to each item and prepare the item for distribution	-Detect and perceive donor -With the donor’s help, develop and implement plan for bringing the donations into the store -Perceive donated items and categorize them -Organize the items in the back of the store and prepare them for pricing -Perceive an item and use the pricing guidelines and personal judgement to determine the price of the item -Indicate the price of the item -Place the priced item in either the thrift store cart or the boutique cart so that it can be distributed to the appropriate store

Table E-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function “Receive and Price Merchandise”

Task	Decision-making	Response	Teamwork/Communication
Detect and perceive donor	<ul style="list-style-type: none"> -Relative -The personnel member must evaluate each person who enters the store and must distinguish the donors from the customers 	<ul style="list-style-type: none"> -Search for cues which indicate that a person is a donor (he or she is in a hurry, he or she is carrying merchandise into the store, etc...) -Determine what kind of merchandise the donor is carrying so that appropriate assistance can be given -Frequent task; Some accuracy is required so that assistance can be delivered -Task is not time critical unless the donor is in a hurry -The task should be completed while sitting or standing in a position from which a donor can be viewed -No biomechanics are required other than positioning oneself so that the donor can be viewed 	<ul style="list-style-type: none"> -Teamwork or communication are not required as this is an individual task
With help from the donor and other personnel, develop and implement plan for bringing the donations into the store	<ul style="list-style-type: none"> -Relative -The personnel must compare plans and choose the one which requires the least time to execute 	<ul style="list-style-type: none"> -The personnel member should think about the different tools he or she has that can be used to assist the donor and should think of the best way to help the donor -The personnel member should also receive input from the donor and from the other personnel members regarding the best way to bring the donor's merchandise into the store -The personnel member should then follow the donor to his or her vehicle with the appropriate tools and should assist the donor -The personnel member should repeat this task until all of the donor's items have been moved into the store -Then, the personnel member should offer the donor a donation receipt and should express gratitude -Frequent task; enough accuracy is required so that all of the donor's items are successfully transported into the store -Task is not time critical but should be completed in a timely manner so that the donor can be happy with the customer service (and possibly return) -A wide variety of biomechanics are required for this task and depend on the type of items that are being donated -For example, heavy boxes that cannot be carried would require the personnel member 	<ul style="list-style-type: none"> -Teamwork and communication are imperative for this task -Communication is helpful during the development of an assistance plan because the donor(s) and personnel member(s) may have useful tips -Teamwork and coordination are necessary while bringing the donated items into the store so that the physical burden on a single person can be

		<p>to push a cart to the donor's vehicle, load the items into the cart with significant force, and then push the cart back into the store</p> <p>-In most cases, the donor should walk to the donor's vehicle and should exert significant force when bringing the donated items into the store</p>	lessened
Perceive donated items and categorize them	<p>-Relative</p> <p>-The personnel member must compare donated items and make important distinctions between them</p>	<p>-Detect and perceive donated item</p> <p>-Determine what the donated item is</p> <p>-Categorize the donated item as clothing, artwork, furniture, etc...</p> <p>-Very frequent task (constant flow of donations); some accuracy is required but it is fine if some donated items are misperceived or categorized incorrectly</p> <p>-This task is not time critical unless donations are flooding into the store</p> <p>-This task should be completed while standing up</p> <p>-The personnel member needs to lift some of the donations in order to perceive them and the force required depends on the weight of the donations</p>	-No communication or teamwork is required for this task as it is an individual task
Organize the items in the back of the store and prepare them for pricing	<p>-Relative</p> <p>-The personnel member must compare the various locations in the back of the store and determine where the given merchandise belongs</p>	<p>-Assess the various locations in the back of the store and determine which location contains items in the same category as the donated item</p> <p>-Place donated item in the selected location</p> <p>-Very frequent task; some accuracy is required but it is fine if some donated items are organized incorrectly (not all donations will be categorized and organized perfectly)</p> <p>-This task is not time critical unless the donations are rapidly accumulating in the back</p> <p>-This task should be completed while standing up</p> <p>-The personnel member needs to lift some of the donations and the force required to lift them depends on the weight of the donations. Then, the personnel member needs to walk to the chosen location with each donation and deposit each donation at the location.</p>	<p>-Teamwork and communication are not required for this task, but could facilitate the completion of it</p> <p>-If multiple personnel work together to organize and sort the donations, the time required for the task would lessen</p>
Perceive an item and use the pricing	<p>-Probabilistic</p> <p>-The personnel</p>	-In the back of the store, collect a donation from one of the storage areas that is nearly full	-Teamwork and communication

<p>guidelines and personal judgement to determine the price of the item</p>	<p>member must determine the odds that a specific price is appropriate</p>	<ul style="list-style-type: none"> -Perceive the donation and analyze its condition, brand name, age, usability, availability, etc... -Use the pricing guidelines and one's personal judgement to determine the price of the item -If the item is in terrible condition or cannot be accepted into the store, it should be recycled or donated to a different organization -Very frequent task; it is impossible to be completely accurate because the thrift store prices are lower than the market prices of the same items. However, enough accuracy is required so that the prices are not too low and not too high. -This task is not time critical unless the donations are rapidly accumulating in the back -This task should be completed while standing up -The personnel member needs to lift and carry the donated item to the pricing counter (force required depends on the weight of the donation). 	<p>are not required but could facilitate the completion of this task</p> <ul style="list-style-type: none"> -If a personnel member does not know what price a donation should have, he or she should consult the other volunteers or manager
<p>Indicate the price of the item</p>	<ul style="list-style-type: none"> -Relative -The personnel member must compare the different pricing techniques and determine which is most appropriate for the item 	<ul style="list-style-type: none"> -If the item is a clothing item, attach a price tag to the clothing and write the price on the tag along with the size of the clothing item, and whether the clothing item is for men or women -If the item is small and is not clothing, attach a sticker to the item and write the price of the item on the sticker -If the item is large and is not clothing, put masking tape on the item and write the price of the item on the tape -If the item is in a category of items, such as t-shirts, which have a fixed price, a price indicator should not be attached -Very frequent task; near perfect accuracy is required so that the price is visible and matches the determined price for the item -This task is not time critical unless the donations are rapidly accumulating in the back -This task should be completed while standing up -The personnel needs to use his or her hands 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task as there is little space at the pricing counter -If the rate at which donations are priced is lower than the rate at which donations arrive, more than one volunteer should price donations at once

		to do various actions, such as pulling the trigger of the ticket gun or writing the price of an item on the tag, sticker, or tape.	
Place the priced item in either the thrift store cart or the boutique cart so that it can be distributed to the appropriate store	-Relative -The personnel member must choose between the thrift store cart and the boutique cart	-Based on the price of the item, determine whether the item belongs in the thrift store or boutique (where the more expensive items are sold) -If the item belongs in the thrift store, put it in the thrift store cart -If the item belongs in the boutique, put in in the boutique cart -If the item is so big that it cannot fit in either cart, place it on the ground next to the cart it belongs in -If the personnel member cannot determine which store the item belongs in, he or she should discuss the issue with the other volunteers or manager before making a decision -Very frequent task; enough accuracy is required so that the more expensive items are put in the boutique cart and the cheaper items are put in the thrift store cart -This task is not time critical unless the donations are rapidly accumulating in the back -This task should be completed while standing up -The personnel needs to lift and transport the donated items into (or next to) the carts so the force required depends on the weight of the items	-Teamwork and communication are not required for this task -If a personnel member does not know what store an item belongs in, he or she should consult the other volunteers or manager

Table E-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function “Receive and Price Merchandise”

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Detect and perceive donor	N/A	-There is no established worksite for this task -This task will occur in the store, so the temperature	-Reduced staffing could hinder this task because if there are only a few personnel in the store, it would take longer to detect a donor	-Low potential for personal injury as no physical contact is being made

		<p>and lighting are set at comfortable levels</p> <p>-The noise level will depend on the number of customers and volunteers in the store</p>	<p>-A lack of situational awareness due to fatigue, distractions, or limited sight could hinder this task and make it hard to detect a donor</p> <p>-Sometimes it is hard to distinguish between a donor and a customer because many customers bring large bags into the store like a donor would</p>	
<p>With help from the donor and other personnel, develop and implement plan for bringing the donations into the store</p>	<p>-Multiple hand carts and flatbed carts are available for this task</p>	<p>-There is no established worksite for this task</p> <p>-The task can occur inside or outside of the store, so there should be enough light but the temperature and noise level will be variable</p> <p>-The implementation of the plan will occur outside so conditions would depend on the weather and the time of year</p> <p>-Because the store is not open at night, this location will always be lit</p>	<p>-Reduced staffing could prevent this task from occurring in the first place because sometimes there are not enough personnel present such that one can take a break from his or her work and assist the donor</p> <p>-Another factor which can hinder this task is if the donor is rude or bellicose and does not respect the personnel member who is trying to help</p> <p>-Another factor which could hinder this step is if the parking lot is packed because this would make it harder to retrieve items from the donor's vehicle</p> <p>-No storage space for incoming items and extremely</p>	<p>-Low potential for personal injury</p> <p>-The donated items could be hazardous due to their weight, sharpness, or other attributes</p>

			heavy donations are other factors which can hinder this task	
Perceive donated items and categorize them	-Procedure for how to organize donated items in the back of the store is available	-This task will occur in the back of the store -The ingress and egress paths could be blocked by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers in the back of the store	-A lack of situational awareness due to distractions or limited sight could hinder this task and make it difficult to identify donations -Time pressure could be a factor which hinders this task if there is a surfeit of donations and a lack of personnel	-Low potential for personal injury -Some of the donated items could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by a donation
Organize the items in the back of the store and prepare them for pricing	-Procedure for how to organize donated items in the back of the store is available -Various bins and boxes in the back of the store are available for this task	-This task will occur in the back of the store -The ingress and egress paths could be blocked by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers in the back of the store	-Time pressure could be a factor which hinders this task if there is a surfeit of donations and a lack of personnel	-Low potential for personal injury -Some of the donated items could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by a donation
Perceive an item	-The pricing	-This task will	-One factor which	-Low potential

and use the pricing guidelines and personal judgement to determine the price of the item	guidelines sheet is posted in the back of the store and is a valuable tool for pricing	occur in the back of the store -The ingress and egress paths could be blocked by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers in the back of the store	can make it hard to determine the price of an item is fatigue, which makes it hard to perceive relevant visual cues such as holes and cracks -Time pressure could be a factor which hinders this task if there is a surfeit of donations and a lack of personnel	for personal injury -Some of the donated items could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by a donation
Indicate the price of the item	-Ticketing guns, sharpies, pens, pricing labels of various colors, masking tape, and stickers are available for this task	-This task will occur in the back of the store -The ingress and egress paths could be blocked by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers in the back of the store	-Fatigue could make it hard to price an item because it could cause the pricer to write the wrong price or use an inappropriate price indicator -Time pressure could be a factor which hinders this task if there is a surfeit of donations and a lack of personnel	-Low potential for personal injury -Some of the donated items could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by a donation -The ticket gun could also be hazardous if it is used incorrectly
Place the priced item in either the thrift store cart or the boutique cart so that it can be distributed to the appropriate store	-1 cart for the thrift store and 1 cart for the boutique should be used for this task	-This task will occur in front of the entrance to the back of the store -The ingress and egress	-Fatigue could cause the pricer to put a priced item in the incorrect cart -Time pressure could be a factor which hinders this	-Low potential for personal injury -Some of the donated items could be sharp or

		<p>paths could be blocked by merchandise</p> <p>-The temperature and lighting should be at comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the store</p>	task if there is a surfeit of donations and a lack of personnel	hazardous but it is incredibly rare for a personnel member to be hurt by a donation
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Table E-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function “Receive and Price Merchandise”

Task	Narrative of Activities	Applicability	Time Required
Detect and perceive donor	-The personnel member should first acknowledge either a visual or auditory cue which indicates that a person is a donor. Then, the personnel member should perceive what kinds of items the donor is carrying and should use that knowledge to deliver proper assistance later on.	This task is important because it allows for a donor to be identified and assisted later on	1 minute (personnel could be distracted by other customers)
With help from the donor and other personnel, develop and implement plan for bringing the donations into the store	-The personnel member should determine the best tools to use and actions to take in order to successfully assist the donor. He or she should also heed the donor's or other personnel members' advice so that an effective assistance plan can be formulated. Then, the personnel member should retrieve the appropriate tools and should follow the donor to his or her vehicle. At this point, the personnel member should start transferring the donated items into the store	This task is critical because it facilitates the flow of merchandise into the store. Without this task, the store could run out of its supply of merchandise and could therefore lose profits	20 minutes (the donor could have a plethora of donations)

	<p>and should repeat the above steps until all donated items have been moved into the store. Finally, the personnel member should put the tools away and should give a donation receipt to the donor if he or she requests one. The personnel member should also thank the donor for donating to a worthy cause.</p>		
Perceive donated items and categorize them	<p>First the personnel member needs to identify the donations. Then he or she should pick up and observe one of the donated items and should determine what it is. Then, the personnel member should categorize the donation so that it can be placed in the appropriate location during the subsequent task.</p>	<p>This task is important because it forms the framework for how the donations will be organized before pricing.</p>	<p>20 seconds for one item (the personnel member may need to identify an unknown donation before he or she can categorize it)</p>
Organize the items in the back of the store and prepare them for pricing	<p>First the personnel member needs to look at the various storage spaces in the back of the store. If there is room in a storage space which contains the same kind of donations as the donation the personnel member just categorized, the personnel member should place the donation in that space. If not, the personnel member should find a storage area with space and should place the donation in that area.</p>	<p>This task is necessary because if the donations are not organized, it would be harder to price the donations in groups and potentially valuable donations could be lost.</p>	<p>1 minute for one item (many potential storage spaces could be full)</p>
Perceive an item and use the pricing guidelines and personal judgement to determine the price of the item	<p>The personnel member needs to go to one of the storage areas that is nearly full, and should retrieve a group of donated items. Then, the personnel member should bring them to the pricing counter and</p>	<p>This task is quintessential because the store will lose money if the merchandise is priced too low, and will lose customers (and therefore</p>	<p>30 minutes (the personnel should research the prices of antique items and artwork)</p>

	<p>should perceive one of them. The personnel member should use the pricing guidelines and personal judgement to determine the price of the item. Factors such as the condition, age, and usability of the item should be considered before the price is decided upon. If the personnel member cannot decide on the price, he or she should ask other personnel members or the manager for advice. Also, if a donated item is in terrible condition or cannot be displayed in the store, it should be recycled or given to a different organization.</p>	<p>money) if the merchandise is priced too high.</p>	
<p>Indicate the price of the item</p>	<p>Once the price has been determined, the personnel member should identify whether the item is large or small and whether it is a clothing item. If it is small and is not clothing, a sticker should be attached to the item so that it is visible. Then, the price of the item should be written on the sticker. If the item is large and is not clothing, the price of the item should be written on masking tape which should then be stuck onto the item in a visible area. If the item is a clothing item, then the ticketing gun should be used to attach a price tag to the right side of the clothing item when the front of the clothing item is facing upwards in front of the personnel member. On the price tag, the price of the clothing item, the size of the clothing item, and whether the item is for men or women</p>	<p>This task is very important because an item cannot be sold if the price is not indicated</p>	<p>1 minute for each item (personnel member may need to find more stickers, tags, and other price indicators if he or she runs out)</p>

	should be written. Some categories of items have a fixed price so if the item falls into one of those categories, it should be placed into one of the two carts without a price indicator.		
Place the priced item in either the thrift store cart or the boutique cart so that it can be distributed to the appropriate store	First, the personnel member should look at the price of the item. If the price is low, he or she should put it in the thrift store cart. If it is high, he or she should put it in the boutique cart. If the personnel member cannot fit the item into either cart, he or she should place the item next to the cart it belongs in so as to indicate that it should be moved to the corresponding store. If the personnel member cannot decide which store the item belongs in, he or she should consult the other personnel.	This task is important because if it is left uncompleted, the priced merchandise would not be distributed in an efficient manner	1 minute for each item (the personnel member may need to consult the other personnel)

Table E-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Receive and Price Merchandise"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Detect and perceive donor	-Cognitive: 1.4/5 -Physical: Low -Overlap of task requirements: Serial	At least 2	Strong situational awareness is required for this task
With help from the donor and other personnel, develop and implement plan for bringing the donations into the store	-Cognitive: 1.6/5* -Physical: High (depends on the weight of the donations, but there will usually be a significant physical workload) -Overlap of task	At least 2	Knowledge of the tools that can be used to transport merchandise as well as experience with helping donors are required. Also, enough strength is required so that the

	requirements: Serial		donated items can be successfully moved into the store.
Perceive donated items and categorize them	-Cognitive: 2.0/5 -Physical: Low -Overlap of task requirements: Serial	At least 2	Experience and knowledge regarding the kinds of donations that enter the store are required for this task.
Organize the items in the back of the store and prepare them for pricing	-Cognitive: 1.4/5 -Physical: Moderate (depends on weight of the donations) -Overlap of task requirements: Serial	At least 2	Strong situational awareness and knowledge of the various storage locations in the back of the store are necessary for this task. Also, at least one personnel member should be strong enough to lift heavy donations.
Perceive an item and use the pricing guidelines and personal judgement to determine the price of the item	-Cognitive: 2.4/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	General knowledge of the value of different kinds of clothes and miscellaneous items is necessary for this task.
Indicate the price of the item	-Cognitive: 2.4/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	Knowledge of the procedure to follow when pricing an item and the ability to use the ticket gun are necessary for this task
Place the priced item in either the thrift store cart or the boutique cart so that it can be distributed to the appropriate store	-Cognitive: 1.8/5 -Physical: Medium (depends on the weight of the item) -Overlap of task requirements: Serial	At least 2	Knowledge of the difference between the boutique and thrift store and of what kinds of items are sold in each store is needed for this task

Section E.5: Questionnaire for Function “Receive and Price Merchandise”

Method Used: Talk-Through Walk-Through

Manager:

-How do you and the other volunteers respond when a donor brings items into the store?
He and the other volunteers assist with bringing items in. When they arrive at the donor's vehicle, they assess whether the donated items can be accepted by the store (mattresses, junk, large televisions, and other inconvenient items are unacceptable). The personnel then bring the donated items to the back of the store for sorting, hanging, pricing, and distributing.

-What are some factors that may make it hard to detect that someone is a donor?
He cannot think of any.

-Who decides on how to help the donor and where do they do that?
Sometimes the donors do not need help. If they do and a plan of assistance cannot be decided upon, the manager can decide on the plan in an area around the donor.

-What equipment does the store have that can be used to help a donor bring items into the store?
The store has various hand carts and flatbed carts that can be used to transfer the donated items into the store.

-If you had to assist a donor, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Very little

-If you had to assist a donor, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
Little

-What factors might complicate the situation and make it harder to come up with or implement a plan on how to assist the donor?
One major factor is a shortage of staffing. For example, there could only be one personnel member in the store who is working the cash register. Because aiding the customer at checkout is the most important routine function, the personnel member would not be able to assist donors, especially if there is a line of customers.

-Have there been any instances where a personnel member made a serious mistake while assisting a donor? Why?
Yes. There were some instances where a personnel member accepted prohibited items, such as junk and mattresses.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when assisting a donor?
1

-About how much time would it take you to assist a donor?
About 3 minutes

-Do you follow a plan which describes how items are organized and prepared for pricing in the back of the store? If so, what are the steps of the plan?

Yes, the clothing is stored in clothing bins and the other items are stored in various boxes. The staff then sort, price, hang clothing, and place merchandise in either the thrift store or boutique cart (more valuable merchandise belongs in the boutique cart).

-Do you follow a plan which describes how incoming items are priced? If so, what are the steps of the plan?

Yes. The plan is that personnel should use a price guidelines sheet and their common sense to price items. Afterwards, the priced items should be placed in the thrift store or boutique cart for distribution.

-What are the various visual cues that help you determine the price of an item?

Some of the visual cues include whether the item looks like junk, its condition, its age, its brand name, and its availability in the U.S. market.

-What are some things which may make it hard to perceive all relevant visual cues?

One factor which may make it hard to perceive the relevant visual cues is fatigue. Another is a lack of staffing because a shortage of staffing forces the pricer to price items faster and this can lead to a situation where important visual cues are not perceived.

-What are some of the factors that may cause a personnel member to price an item incorrectly?

The most important factor is a lack of knowledge when it comes to the typical prices of various clothes and merchandise in the United States.

-If you had to price an item, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to price an item, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-What are the various tools and components that you use to price an item?

The volunteers follow pricing guidelines when pricing items, and use tools such as pricing labels of various colors, ticketing guns, and masking tape for pricing.

-Have there been any instances where a price was either too low or too high? Why?

Yes. This happens because of a lack of knowledge and experience regarding the typical prices of commodities in the U.S. Also, antique dealers have posed as volunteers and have intentionally priced valuable antiques at a very low price so they could buy them at a bargain.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when pricing an item?

1

-About how much time would it take you to price an item?

It would take him 20-30 seconds to price normal items, but it would take him much longer to price artwork and antiques because he would do research before he decides on a price.

-What are the donation receipts for?

The purpose of the donation receipts is to make it so the donors can write off the donation on their tax forms because the capital caring thrift store is a 501(c)(3) organization.

Volunteer 1 (assists donors):

-What are the different tasks that you perform in the store?

He runs the cashier, restocks the shelves in the thrift store with items from the cart, transports items to the boutique, and assists donors with carrying donations into the store.

-What are some things that might distract you or make it hard for you to identify a donor?

One factor that makes it hard to identify a donor is when a customer walks into the store with a bag. This makes it hard for Douglas to distinguish between the customer and a donor.

-Is there a plan you should follow for assisting donors?

He does not follow a plan but always treats them with courtesy.

-Who decides on how to help the donor and where do they do that?

The manager has this kind of authority but usually the donor comes up with a plan on how to transport his or her merchandise into the store.

-If you had to assist a donor, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to assist a donor, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-Are you aware of the locations of tools that can be used to help donors bring their items into the store?

He is aware of the locations of tools of this kind.

-On a scale of 1 to 10, how well do you say you communicate with and work with the other volunteers?

5

-What are some factors that may make it difficult to help a donor bring items into the store? How will they make it more challenging?

One factor is parking. If the donor parked his or her vehicle far from the store or in an inconvenient area, it will be harder to transport his or her donations from the vehicle to the store. Another factor is that there is sometimes a surfeit of items in the back of the store, which would make it difficult to store donated items in the store. Sheer weight of the donations is another factor that could make hauling them into the store more challenging.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when assisting a donor?

2

-About how much time would it take you to assist a donor?

It would take him less around 5 minutes to assist a donor.

-Are you aware of a plan which describes how items are organized and prepared for pricing in the back of the store?

He is vaguely aware of this kind of plan.

Volunteer 2 (Prices):

-What are the different tasks that you perform in the store?

She prices and sorts items in the back of the store.

-What are the various visual cues that help you determine the price of an item?

The cleanliness and condition of the item helps her determine the price of an item. She looks for holes and wrinkles that would indicate that the clothing is not in good condition.

-What are some things which may make it hard to perceive all relevant visual cues?

The primary factor she can think of is fatigue because fatigue lowers one's perception.

-If you had to price an item, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to price an item, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Moderate

-Are you aware of the various tools that can be used for pricing?

She is aware of the various tools.

-What factors might result in an irrational price?

One factor is not being mindful of the quality or condition of the item.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when pricing an item?

2

-About how much time would it take you to price an item?

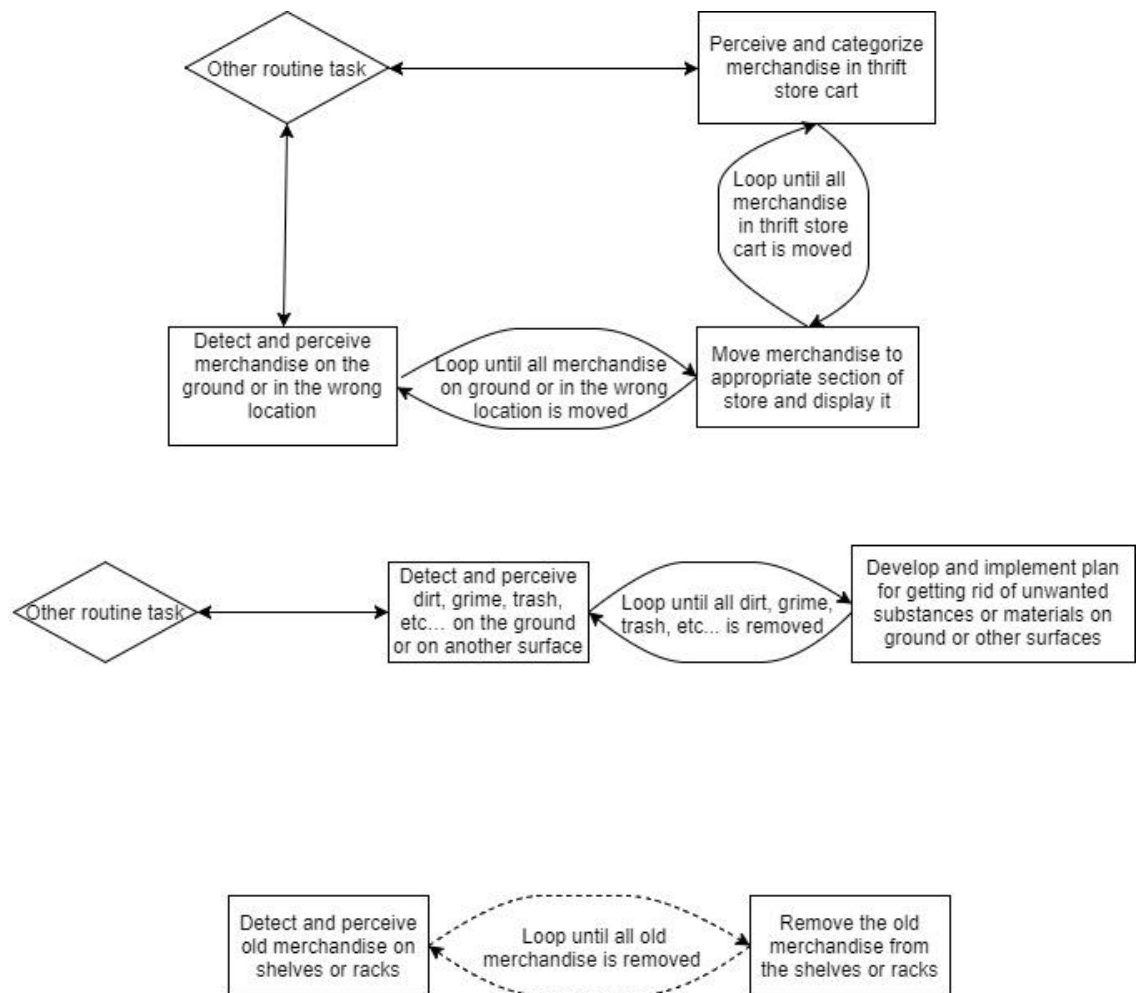
It takes her 30 seconds to a minute to price an item.

-What do you do after you price an item?

She puts the item in either the thrift store cart or the boutique cart.

Appendix F: Routine Function - Distribute Merchandise and Clean

Section F-1: Task Diagram for Function “Distribute Merchandise and Clean”



- > Shaded Arrow: Linear Relationship
- > Unshaded Arrow: Conditional Relationship
- ◄————> Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- Dotted Stem: Usually a coordinated effort

Section F.2: FRA for Function “Distribute Merchandise and Clean”

Table F-1: FRA - Processes, Systems, and Components/Human Actions for Function “Distribute Merchandise and Clean”

Processes	Systems	Components/HAs
-Store personnel distributing merchandise and cleaning	-Volunteers and the manager who can distribute merchandise and	-Display merchandise in appropriate sections -clean bathroom/floor -Ensure clear path to dressing rooms and other areas of the store -Restock items and take old items off of shelves

-Upkeep of store with tools and cleaning materials	clean -Distribute merchandise in store -Clean and organize store	-2 carts -dustpans -brooms -floor sweepers -windex, cleaning agents -Many shelves around the store -Many racks in the middle of the store
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Table F-2: FRA - Purpose and Conditions Indicating Need and Availability for Function
“Distribute Merchandise and Clean”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To generate a profit (routine function)	-Due to the size of the store, it can become very messy and cluttered -Priced items in the cart need to be distributed so that customers can be aware of the items	-There are at least 2 personnel present -There is priced merchandise in the cart

Table F-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function
“Distribute Merchandise and Clean”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
-A volunteer is distributing priced merchandise throughout the store -A volunteer is cleaning the store -A volunteer is organizing the merchandise so that it is less cluttered and easy to find	-Priced merchandise appears on the shelves or racks in the correct locations -The various sections of the store are accessible and visually appealing	-The volunteers can be notified that they should stop distributing merchandise or cleaning/organizing the store -If the store is clean, organized, and stocked with priced merchandise in the correct locations -If there is an emergency in the store

Section F.3: FA for Function “Distribute Merchandise and Clean”

Table F-4: Function Allocation - Current Allocation and Optimal Allocation for Function
“Distribute Merchandise and Clean”

Current allocation	Optimal allocation
<i>Manual control:</i> Experienced and	<i>Manual control:</i> The volunteers should continue to complete these tas

inexperienced volunteers are tasked with distributing merchandise and cleaning the store. They must display the merchandise in the correct sections, clean the floors, clean the bathroom and dressing room, and organize the merchandise so that the store is visually appealing	they are not accompanied by serious consequences if performed incorrectly. In regards to distributing the merchandise in the store, a machine would determine the appropriate section for the merchandise, but would not display the merchandise in an attractive manner. In terms of cleaning the various rooms, a cleaning robot would be able to do a more thorough job than a human, but it would get in the way of customers and possibly annoy them. Finally, allocating the cleaning function to personnel is a better option. Finally, organizing the merchandise and clearing paths through the store should be left to humans because an inexpensive machine would not be able to handle the merchandise or organize it in an attractive way.
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Section F.4: Task Analysis for Function “Distribute Merchandise and Clean”

Table F-5: Task Analysis - Human Actions and Tasks for Function “Distribute Merchandise and Clean”

Human Actions	Tasks
<ul style="list-style-type: none"> -Display merchandise in appropriate sections -Clean bathroom/floor -Ensure clear path to dressing rooms and other areas of the store -Restock items and take old items off of shelves and racks 	<ul style="list-style-type: none"> -Perceive and categorize merchandise in thrift store cart -Detect and perceive merchandise on the ground or in a wrong location -Move merchandise to appropriate section of store and display it -Detect and perceive dirt, grime, trash, etc... on the ground or on another surface -Develop and implement plan for getting rid of unwanted substances or materials on ground or other surfaces -Detect and perceive old merchandise on shelves or racks -Remove the old merchandise from the shelves or racks

Table F-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function “Distribute Merchandise and Clean”

Task	Decision-making	Response	Teamwork/Communication
Perceive and categorize merchandise in thrift store cart	<ul style="list-style-type: none"> -Relative -The personnel member must compare items and make important distinctions between them 	<ul style="list-style-type: none"> -Approach the thrift store cart -Detect an item in the cart -Perceive the item and categorize the item into a category such as pants, toys, kitchen appliances, etc... -Consult the other personnel if the item cannot be categorized -Very frequent task; high accuracy is required so that the item can later be placed in the appropriate location. However, some items cannot be categorized 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task -If a personnel member cannot categorize an item, he or she should consult the other volunteers or manager

		<ul style="list-style-type: none"> -This task is not time critical unless the cart is overflowing with merchandise -This task should be completed while standing up -The personnel member needs to walk towards the thrift store cart and view an item in the cart. Other than these actions, no biomechanics are required. 	
Detect and perceive merchandise on the ground or in a wrong location	<ul style="list-style-type: none"> -Relative -The personnel member must compare the current location of the merchandise with a potentially better location 	<ul style="list-style-type: none"> -Routinely walk through the thrift store -Identify any item that seems out of place or is on the ground -Determine whether the item should be moved to a different location. If so, pick up the item -Frequent task; enough accuracy is required so that items that are obviously out of place are moved to the correct locations (for aesthetic and organizational purposes) -This task is not time critical unless the store is extremely messy -This task should be completed while standing up or bending over if an item is on the ground -The personnel member needs to walk around the store and pick up items that are out of place. The force required to lift the items depends on the weight of the items 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task
Move merchandise to appropriate section of store and display it	<ul style="list-style-type: none"> -Relative -The personnel member must compare the various display areas in the store and determine which is most appropriate for the item 	<ul style="list-style-type: none"> -While holding the item that was either in the cart, on the floor, or in the incorrect location, determine the best place to display the item -If the location cannot be chosen or is already full, consult the other personnel -Move to the chosen area with the item -Multiple items should be carried at once in order to quicken the completion of this task -Display the item in the area such that it is visible and visually appealing -Very frequent task; enough accuracy is required so that the customer can easily see the merchandise on the shelves or racks and so that the store appears to be organized in a semi-professional manner 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task -If the appropriate location for an item cannot be chosen or the chosen location is already full, the personnel member should consult the other personnel

		<ul style="list-style-type: none"> -This task is not time critical unless the cart is overflowing with merchandise or the store is extremely messy -This task should be completed while standing up -The personnel member needs to lift the item and walk it to the correct location. The personnel member may need to rearrange other items on the shelf or rack with his or her hands in order to make room for the new item. The force required to lift and rearrange the items depends on the weight of the items 	
Detect and perceive dirt, grime, trash, etc... on the ground or on another surface	<ul style="list-style-type: none"> -Absolute -The personnel member either detects unwanted substances or materials on the ground or on other surfaces or does not 	<ul style="list-style-type: none"> -While organizing the store or assisting customers, check the ground for anything that needs to be cleaned or removed -Also check the bathroom and dressing rooms for any unwanted materials or substances on the ground -When an unwanted substance or material is found on the ground, identify and determine what it is -Frequent task; enough accuracy is required so that the ground is nearly spotless -This task is not time critical unless glass or another dangerous substance or material is on the ground -This task should be completed while standing up -No biomechanics are required for this task other than looking downwards while walking through the store, dressing rooms, and bathroom 	<ul style="list-style-type: none"> -No teamwork or communication is required for this task as it is an individual task
Develop and implement plan for getting rid of unwanted substances or materials on ground or other surfaces	<ul style="list-style-type: none"> -Probabilistic - The personnel member must develop a cleaning plan with highest probability of success 	<ul style="list-style-type: none"> -Think about a cleaning plan which would have the greatest chance of successfully eliminating the unwanted substance or material -Decide upon the cleaning plan -If a cleaning plan cannot be decided upon, consult the other personnel -Implement the cleaning plan with the available tools -Frequent task; high accuracy is required so that the floor and other surfaces are nearly spotless after 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task, but could facilitate the completion of it

		<p>implementation of the cleaning plan</p> <ul style="list-style-type: none"> -This task is not time critical unless glass or another dangerous substance or material is on the ground -This task should be completed while standing or crouching depending on the tools used -Many different biomechanics are required for this task. For example, the personnel member may have to push the carpet sweeper with moderate force or may have to spray windex on the windows in order to keep them clean. 	
<p>Detect and perceive old merchandise on shelves or racks</p>	<ul style="list-style-type: none"> -Relative -The personnel member must compare older merchandise with newer merchandise in order to determine which items warrant attention 	<ul style="list-style-type: none"> -As the personnel member walks around the store to conduct regular maintenance, he or she should look for merchandise that looks like it has been on display for a significant amount of time -The personnel should then identify the item and compare it with the surrounding items in order to get a sense of the item's tenure in the store -Infrequent task; enough accuracy is required so that old, unpopular merchandise is eventually removed to free up space for new merchandise -This task is not time critical unless the store runs out of space for incoming merchandise -This task should be completed while standing or crouching depending on how low to the ground the item is -No biomechanics are required for this task other than walking to different areas and looking at the merchandise 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task as it is an individual task
<p>Remove the old merchandise from the shelves or racks</p>	<ul style="list-style-type: none"> -Relative -The personnel member must compare the different disposal options for the old merchandise 	<ul style="list-style-type: none"> -If the old item is inexpensive, then recycle it or sell it for free -If the old item is still valuable, lower the price of the item and then return it to the shelf or rack -If a volunteer cannot determine what to do with the old item, the other personnel should be summoned -Infrequent task; enough accuracy is required so that old, unpopular merchandise is removed to free up 	<ul style="list-style-type: none"> -Teamwork and communication are not required for this task, but could facilitate the completion of it -If the personnel member is not able to decide what to do with an old item, he or

		space for new merchandise -This task is not time critical unless the store runs out of space for incoming merchandise -This task should be completed while standing or crouching depending on how low to the ground the item is -The biomechanics required for this task depend on the item. If the item is recycled, then the personnel member must carry it to the recycling bin and dispose of it. If the item is repriced, then it should be carried to the pricing area and repriced. The force required to lift the item and carry it depends on the weight of the item.	she should discuss the issue with the manager or the other volunteers
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Table F-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function "Distribute Merchandise and Clean"

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Perceive and categorize merchandise in thrift store cart	N/A	-This task will occur in front of the entrance to the back of the store -The ingress and egress paths could be blocked by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers and customers in the store	-Time pressure could be a factor which hinders this task if the rate at which merchandise is priced is higher than the rate at which it is distribute -Reduced staffing could also be a hinderance because a lack of help from other personnel could cause the personnel member to feel pressured and experience more stress, which can cloud one's judgement	-Low potential for personal injury
Detect and perceive	N/A	-There is no established	-A lack of situational awareness due to	-Low potential for personal

merchandise on the ground or in a wrong location		<p>worksite for this task</p> <ul style="list-style-type: none"> -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level depends on the number of volunteers and customers in the store 	<p>distractions, fatigue, or limited sight could hinder this task and make it difficult to locate merchandise on the ground or in a wrong location</p> <ul style="list-style-type: none"> -Sometimes items on the ground can be obscured and hidden by merchandise which belongs on the ground 	<p>injury</p> <ul style="list-style-type: none"> -Some of the merchandise could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by merchandise
Move merchandise to appropriate section of store and display it	<ul style="list-style-type: none"> -The store has an established plan for where different kinds of items should be displayed in the store -The thrift store cart can be used to transport merchandise throughout the store 	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level depends on the number of volunteers and customers in the store 	<ul style="list-style-type: none"> -Time pressure could be a factor which hinders this task if the rate at which merchandise is priced is higher than the rate at which it is distributed -Reduced staffing could also be a hindrance because a lack of help from other personnel could cause the personnel member to feel pressured and experience more stress, which can increase the risk of him or her making a mistake -There are times when personnel who lack experience place multiple items in the wrong location and this can cause other personnel to believe that they should place the same kinds of items in the same location 	<p>-Low potential for personal injury</p> <ul style="list-style-type: none"> -Some of the merchandise could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by merchandise

			-A large crowd of customers is another factor which could make it challenging to distribute an item in the store	
Detect and perceive dirt, grime, trash, etc... on the ground or on another surface	N/A	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level depends on the number of volunteers and customers in the store 	<ul style="list-style-type: none"> -A lack of situational awareness due to distractions, fatigue, or limited sight could hinder this task and make it difficult to identify unwanted substances or materials on the ground or on other surfaces -Reduced staffing is another factor which could hinder this task because without enough personnel present, no one would have time to search the store for anything which should be cleaned or removed -A large crowd of customers is another factor which could make it challenging to detect unwanted substances or materials 	-Low potential for personal injury unless the unwanted substance or material is sharp, highly flammable, etc...
Develop and implement plan for getting rid of unwanted substances or materials on ground or other surfaces	-Multiple dustpans, brooms, floor sweepers, and cleaning agents such as Windex are available for this task	<ul style="list-style-type: none"> -There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at 	<ul style="list-style-type: none"> -A large crowd of customers is a factor which could make this task more challenging because it could be hard to stay out of the customers' way -Reduced staffing and a lack of time 	-Low potential for personal injury unless the unwanted substance or material is sharp, highly flammable, etc...

		<p>comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the store</p>	<p>are also factors which could hinder this task because without enough personnel or time, the personnel would not be able to get rid of unwanted substances or materials because more important tasks, such as running the cash register, would be the priority</p> <p>-A lack of knowledge of the tools that can be used for cleaning is another factor which can hamper this task</p>	
Detect and perceive old merchandise on shelves or racks	N/A	<p>-There is no established worksite for this task</p> <p>-This task will occur in the store, so the temperature and lighting are set at comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the store</p>	<p>-A lack of situational awareness due to distractions, fatigue, or limited sight could hinder this task and make it difficult to identify old merchandise on the shelves or racks</p> <p>-A large crowd of customers is another factor which could make this task more challenging because the customers could block the shelves or racks</p> <p>-Reduced staffing is another factor which could hinder this task because without enough personnel present, no one would have time to search the</p>	-Low potential for personal injury

			store for old merchandise	
Remove the old merchandise from the shelves or racks	-The thrift store cart can facilitate the completion of this task	-There is no established worksite for this task -This task will occur in the store, so the temperature and lighting are set at comfortable levels -The noise level depends on the number of volunteers and customers in the store	-A large crowd of customers is a factor which could make this task more challenging because it could be hard to access the shelves or racks when customers are in the way -Reduced staffing and a lack of time are also factors which could hinder this task because without enough personnel or time, the personnel would not be able to invest time into removing old merchandise because more important tasks, such as running the cash register, would be the priority	-Low potential for personal injury -Some of the merchandise could be sharp or hazardous but it is incredibly rare for a personnel member to be hurt by merchandise

Table F-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function "Distribute Merchandise and Clean"

Task	Narrative of Activities	Applicability	Time Required
Perceive and categorize merchandise in thrift store cart	The personnel member should first approach the thrift store cart and should identify an item in the cart. Then, he or she should process what the item is and should categorize the item. If the personnel member is unable to categorize the item, he or she should consult the other personnel.	This task is crucial because it forms the basis for how the items will be distributed and organized in the store	1 minute for each item (the personnel member may need to consult the other personnel)
Detect and perceive merchandise on	The personnel member should walk through the store and should direct his or her	This task is important because it reinforces the	5 minutes if the personnel member is actively looking for

the ground or in a wrong location	vision towards merchandise on the shelves and racks and towards anything on the ground. When the personnel member detects an item on the ground or an item on a shelf or rack that seems out of place, he or she should determine whether the item actually belongs in that location. If it does, it should be left alone, but if it does not, it should be retrieved by the personnel member.	organization of the merchandise and makes the store more attractive to customers	the items on the ground (the items could be obscured)
Move merchandise to appropriate section of store and display it	First, the personnel member should determine the best location for the items he or she has retrieved. If the personnel member cannot decide on the best location for each item or realizes that the chosen locations are already full, he or she should ask another personnel member for help. Then, the personnel member should carry the items to the chosen locations and should display them so that they are visible and visually appealing. The other merchandise on the shelves or racks may need to be rearranged in order to accommodate the new items.	This task is important because it is when merchandise is distributed and made available to customers	2 minutes for each item (the personnel member may need to consult other personnel and the chosen location for an item could be unavailable)
Detect and perceive dirt, grime, trash, etc... on the ground or on another surface	The personnel member should walk around the store and should enter the dressing rooms and bathrooms when they are empty. If he or she detects any dirt, grime, trash, glass, or any other unwanted substances or materials on the ground or walls, he or she should identify the substances or materials.	This task is fairly important because without it, the store cannot be kept clean and would not be appealing to customers.	20 minutes if the personnel member is actively looking for unwanted substances or materials (some of the substances or materials could be in areas which are occupied, such as the dressing rooms and bathroom)

Detect and perceive old merchandise on shelves or racks	The personnel member should check the shelves and racks while conducting regular maintenance in the store. He or she should look for items that appear as if they have been on display for a significant amount of time relative to the other merchandise on display. If the personnel member is not sure of the tenure of the item, he or she should leave the item as it is.	This task is important because if old merchandise is not cleared off the shelves and racks, there will be no room for newer, more popular merchandise	30 minutes if the personnel member is actively searching for old merchandise (it would take longer to assess all of the merchandise if the store is crowded)
Remove the old merchandise from the shelves or racks	The personnel member should determine whether the old item should be recycled or repriced. If the item has a high price, the price should be lowered and the item should be returned to the shelf or rack. If the item has a low price, then it should be recycled or sold for free. If the personnel member is unsure of what to do with the old item, he or she should consult the other personnel.	This task is necessary because old merchandise needs to be cleared off of the shelves and racks in order to make room for new merchandise	4 minutes for each item (the personnel member may need to consult other personnel and may need to reprice the given item)

Table F-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Distribute Merchandise and Clean"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Perceive and categorize merchandise in thrift store cart	-Cognitive: 1.6/5* -Physical: Low -Overlap of task requirements: Usually parallel with a routine task	At least 2	Knowledge of the various categories of items in the store is needed for this task
Detect and perceive merchandise on the ground or in a wrong location	-Cognitive: 1.4/5 -Physical: Low -Overlap of task requirements: Usually parallel with a routine task	At least 2	Strong situational awareness and knowledge of the areas for specific categories of items are required

			for this task
Move merchandise to appropriate section of store and display it	-Cognitive: 1.6/5* -Physical: Moderate (depends on the weight of the merchandise) -Overlap of task requirements: Serial	At least 2	Knowledge of the areas for specific categories of items are required for this task
Detect and perceive dirt, grime, trash, etc... on the ground or on another surface	-Cognitive: 1.4/5 -Physical: Low -Overlap of task requirements: Usually parallel with a routine task	At least 2	Strong eyesight and situational awareness are required for this task.
Develop and implement plan for getting rid of unwanted substances or materials on ground or other surfaces	-Cognitive: 2.0/5* -Physical: Moderate (depends on tool(s) required to remove the substance or material) -Overlap of task requirements: Serial	At least 2	Knowledge of the various cleaning tools available and how to use each tool is required for this task.
Detect and perceive old merchandise on shelves or racks	-Cognitive: 1.4/5 -Physical: Low -Overlap of task requirements: Serial	At least 2	Strong situational awareness and experience in the store are required for this task.
Remove the old merchandise from the shelves or racks	-Cognitive: 2.0/5* -Physical: Moderate (depends on weight of merchandise) -Overlap of task requirements: Serial	At least 2	Knowledge of the procedure to follow when removing old merchandise is necessary for this task.

Section F.5: Questionnaire for Function “Distribute Merchandise and Clean”

Method Used: Talk-Through Walk-Through

Manager:

-Is there an established plan for distributing items from the cart?

Yes. Items should be taken from the thrift store cart to be distributed in the thrift store, and the boutique cart should be taken to the boutique and unloaded there.

-What are some of the factors that may make it hard to identify where an item in the cart should be placed?

The only factor is a lack of common sense.

-Do you routinely check for items that are on the ground? If so, what are some of the factors that may make it hard to identify these items?

He checks constantly for items that are on the ground and one factor that can make it hard to identify the items is if they are piled under something.

-What factors may make it hard to place an item in the correct location?

One factor is that the personnel member could be overwhelmed by the number of donations coming in and could rush and make a mistake.

-If you had to distribute a priced item in the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to distribute a priced item in the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when distributing an item in the store?

1

-About how much time would it take you to distribute an item in the store?

It would take him about 1 minute.

-What factors may make it hard to detect that the store needs to be cleaned or organized?

There are none he can identify.

-Do you have the authority to delegate cleaning and organizing tasks to volunteers?

He does have this kind of authority.

-What equipment or tools does the store have that can be used for cleaning?

The store has brooms, mops, vacuums, dust pans, carpet sweepers, and cleaning detergents and agents.

-What factors may make it difficult to efficiently clean or organize the store?

One factor is a lack of supplies, which may make it difficult to clean the floor or other surfaces in an efficient manner. A lack of time and a lack of staffing are also factors which could make cleaning and organizing the store more difficult.

-If you had to clean and organize the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to clean and organize the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when cleaning or organizing the store?

3

-About how much time would it take you to clean or organize the store?
It depends on how messy or dirty the store is.

Volunteer 1:

-What are the different tasks that you perform in the store?
She sorts clothing and other donations, prices items, cleans the store, and distributes items in the thrift store.

-When you distribute an item from the cart, what are some things that might make it hard for you to identify the appropriate location for the item?
She cannot think of any.

-Do you routinely check for items that are on the ground? If so, what are some of the factors that may make it hard to identify these items?
She does routinely check for items on the ground. She cannot think of any factors which would make identifying items on the ground more challenging.

-Is there a plan you should follow for distributing items from the cart?
She is not aware of such a plan.

-If you had to distribute an item in the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Moderate

-If you had to distribute an item in the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
Little

-What are some factors that may make it difficult to distribute an item in the store? How will they make this task more challenging?
The largest factor is a lack of staffing. Without enough personnel present, there might not be someone to distribute the items from the cart.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when distributing an item in the store?
1

-About how much time would it take you to distribute an item in the store?
It would take her about 30 seconds to distribute an item in the store.

-Are you aware of a plan which describes how the store should be cleaned and organized?
She is not aware of such a plan.

-What kinds of things do you look for when you are cleaning?
She looks for anything that is soiled, torn, or inappropriately priced

-What kinds of things do you look for when you are organizing the store?
She looks for whether the items in the store match the season.

-What are some things which may make it hard to perceive that the store needs to be cleaned or organized?

One factor which could make it hard to perceive that the store needs to be cleaned or organized is a lack of volunteers. With a deficit of volunteers, unwanted substances or materials would be harder to find. A crowd of customers in the store could also make it hard to find unwanted substances or materials.

-If you had to clean or organize the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to clean or organize the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-Are you aware of the various tools that can be used for cleaning the store?

She is aware of the various tools.

-What factors might make it hard to clean or organize the store?

One factor is that customers could be in the way and could block one's efforts to clean or organize.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when cleaning or organizing the store?

2

-About how much time would it take you to clean or organize the store?

It would take her less than 2 hours.

Volunteer 2:

-What are the different tasks that you perform in the store?

She hangs items, sorts items, distributes items, and cleans and organizes the store.

-When you distribute an item from the cart, what are some things that might make it hard for you to identify the appropriate location for the item?

One factor that might make it hard for her to identify the appropriate location is if some items in the same category were misplaced and make it hard for her to identify the actual location for the item she is distributing.

-Do you routinely check for items that are on the ground? If so, what are some of the factors that may make it hard to identify these items?

She routinely checks for items that are on the ground. She cannot think of any factors that may make it hard to identify these items.

-Is there a plan you should follow for distributing items from the cart?

She is not aware of a plan but knows that the cart should never be too full.

-If you had to distribute an item in the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to distribute an item in the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-What are some factors that may make it difficult to distribute an item in the store? How will they make this task more challenging?

One factor that may make it difficult to distribute an item in the store is if the store is crowded. This is because the customers may block the paths to the appropriate location for the item.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when distributing an item in the store?

1

-About how much time would it take you to distribute an item in the store?

It would take her about 1 minute.

-Are you aware of a plan which describes how the store should be cleaned and organized?

She is aware of a plan which calls for the volunteers to ask the manager for details regarding what should be cleaned or organized.

-What kinds of things do you look for when you are cleaning?

She looks for little pieces of stuff, trash, or food on the floor, and looks for dust or stains on glass and other surfaces.

-What kinds of things do you look for when you are organizing the store?

She looks at the merchandise on display to make sure that everything is on the correct rack or shelf.

-What are some things which may make it hard to perceive that the store needs to be cleaned or organized?

One factor is if the store is crowded. A crowd of people could make it difficult to view certain areas of the store that are dirty or messy.

-If you had to clean or organize the store, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to clean or organize the store, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-Are you aware of the various tools that can be used for cleaning the store?

She is aware of the various tools

-What factors might make it hard to clean or organize the store?

One factor that makes it hard is that it can take hours to clean and organize the store. As a result, fatigue can be a problem.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when cleaning or organizing the store?

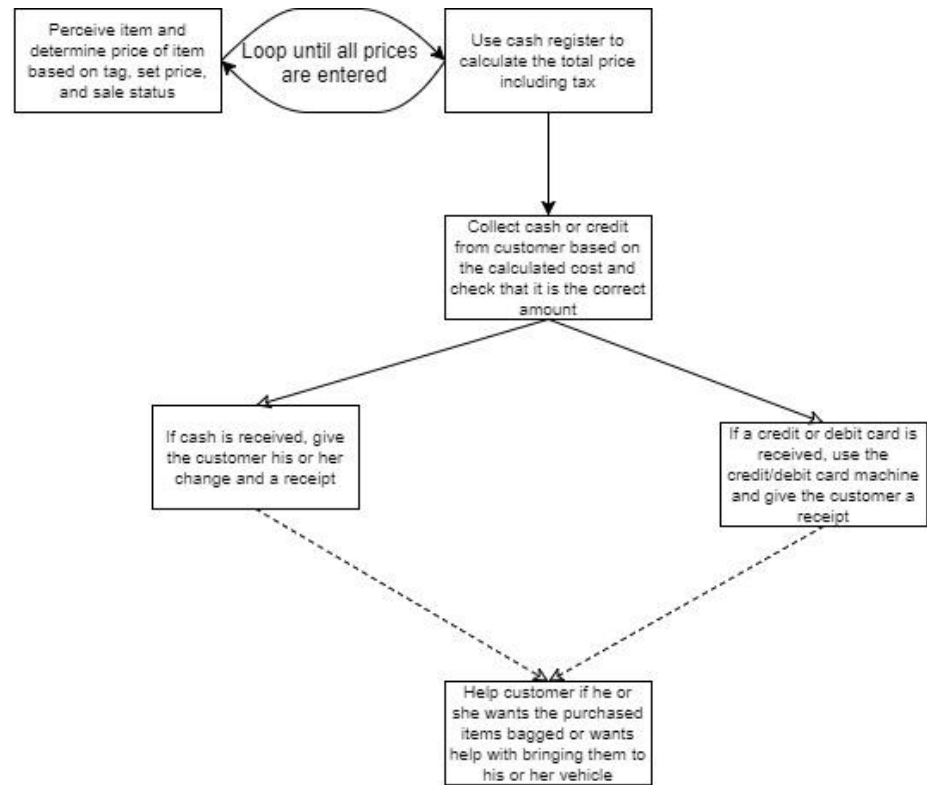
1

-About how much time would it take you to clean or organize the store?

It would take her about 2 hours to clean or organize the store by herself.

Appendix G: Routine Function - Aid Customer at Checkout

Section G.1: Task Diagram for Function “Aid Customer at Checkout”



- > Shaded Arrow: Linear Relationship
- > Unshaded Arrow: Conditional Relationship
- > Double Arrow: Parallel Relationship
- Solid Stem: Usually one person required
- Dotted Stem: Usually a coordinated effort

Section G.2: FRA for Function “Aid Customer at Checkout”

Table G-1: FRA - Processes, Systems, and Components/Human Actions for Function “Aid Customer at Checkout”

Processes	Systems	Components/HAs
<ul style="list-style-type: none"> -Store personnel aiding customers at checkout -Output of merchandise via a monetary transaction 	<ul style="list-style-type: none"> -Volunteers and the manager who can aid customers at checkout -Conduct monetary exchange -Interact with customer 	<ul style="list-style-type: none"> -Receive money from customer -Process money or credit received -Return change to customer -Assist customer through the monetary exchange -Help customer carry heavy items to his or her vehicle -cash register -card machine -pens -paper for receipts -calculators

Table G-2: FRA - Purpose and Conditions Indicating Need and Availability for Function “Aid Customer at Checkout”

Purpose	Conditions indicating that the function is needed	Parameters indicating that the function is available
To generate a profit (routine function)	<ul style="list-style-type: none"> -In order to generate a profit, a checkout function is needed so that a monetary exchange can be conducted -Customers need help during the checkout process because they are not allowed to use the cash register or card machine 	<ul style="list-style-type: none"> -There is at least one personnel member in the store -The store has power -The cash register and card machine are tested to make sure that they operate well

Table G-3: FRA - Parameters Indicating Operation, Success, and Terminability for Function “Aid Customer at Checkout”

Parameters indicating that the function is operating	Parameters indicating that the function is achieving its purpose	Parameters indicating that the operation of the function can or should be terminated
<ul style="list-style-type: none"> -The cash register is stationed by a volunteer who conducts the monetary exchange with customers -The customers in the checkout line are helped one 	<ul style="list-style-type: none"> -The checkout line is never exceedingly long -The monetary exchange is conducted without any calculation errors -The customer is satisfied 	<ul style="list-style-type: none"> -The personnel stationed at the checkout counter can be asked to stop working -If there are no customers in the checkout line -If there is an emergency in

at a time by the cashier -The cashier or an accompanying volunteer helps the customer bag his or her items and transport them if asked to	and receives help with bagging and transferring merchandise to his or her vehicle	the store -If the price of an item is unclear
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Section G.3: FA for Function “Aid Customer at Checkout”

Table G-4: Function Allocation - Current Allocation and Optimal Allocation for Function “Aid Customer at Checkout”

Current allocation	Optimal allocation
<p><i>Operation by consent/delegation:</i> The personnel work with the automated cash register and credit card machine to conduct the monetary exchange. The volunteer/manager receives credit and returns change while conversing with the customer. However, the volunteer/manager uses the cash register to calculate the cost of the merchandise and the amount of change, and uses the credit card machine to make automatic transactions with the credit card. Thus, automation takes control at this step of the function but remains under close supervision by the cashier. The rest of the check out function, including bagging the merchandise and helping the customer transfer heavy merchandise to his or her vehicle, is accomplished by volunteers.</p>	<p><i>Operation by consent/delegation:</i> Some retailers have implemented checkout stations where customers can pay for merchandise without cash present. However, this would be impractical in the thrift store because not enough customers in the store at once to warrant the implementation of additional checkout systems and the variability of sales and prices makes it difficult for an automated checkout machine to function effectively. <i>Operation by consent/delegation</i>, whereby the cashier lets the cash register and take control under close supervision, is optimal. During this step, the merchandise and the change to be returned are calculated using the cash register and the automatic transaction with a credit card is conducted via the credit card machine. With this kind of operation by consent/delegation, there are multiple errors which exist, such as failing to account for a sale price or returning the wrong amount of change. However, the personal connection formed between the cashier and customer makes up for these shortcomings. Additionally, implementing an automated checkout system would require an excessive and unnecessary investment by the thrift store. If the cash register or card machine malfunctions, the cashier should be able to access the money in the cash register and make transactions manually. Bagging items and helping with the transfer of heavy merchandise should also be allocated to personnel because an inexpensive machine cannot be able to properly handle fragile merchandise and a personal connection cannot be formed with a machine.</p>

Section G.4: Task Analysis for Function “Aid Customer at Checkout”

Table G-5: Task Analysis - Human Actions and Tasks for Function “Aid Customer at Checkout”

Human Actions	Tasks
<ul style="list-style-type: none"> -Receive money from customer -Process money or credit received -Return change to 	<ul style="list-style-type: none"> -Perceive item and determine price of item based on tag, set price, and sale status -Use cash register to calculate the total price including tax -Collect cash or credit from customer based on the calculated cost and check that it is the correct amount

customer -Assist customer through the monetary exchange -Help customer carry heavy items to his or her vehicle	-If a credit or debit card is received, use the credit card machine and give the customer a receipt -If cash is received, give the customer his or her change and a receipt -Help customer if he or she wants the purchased items bagged or wants help with bringing them to his or her vehicle
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Table G-6: Task Analysis - Decision-Making, Response, and Teamwork/Communication for Tasks of Function "Aid Customer at Checkout"

Task	Decision-making	Response	Teamwork/Communication
Perceive item and determine price of item based on tag, set price, and sale status	-Relative -The personnel member needs to evaluate the price indicator, sales board, and/or the price sheet in order to determine the price	-When the customer puts an item on the counter, immediately begin to look for the price tag or price indicator -If an item does not have a price tag or price indicator, look at the price sheet to determine if the item has a set price (jeans, t-shirts, and books are some of the items that have set prices) -If the price cannot be determined, the manager should be called -After identifying the price, look at the sale board and check if the given item is on sale -If the given item is on sale, apply the reduction to its price -Very frequent task; 100% accuracy is required so that a fair monetary transaction takes place -This task is not time critical unless there is a long line of customers at the checkout counter -This task should be completed while standing -The personnel member must move each item in his or her hands in order to search for the price. Thus, the force required depends on the weight of the items.	-Teamwork and communication are not necessarily required for this task -The personnel member may need to communicate with the customer when determining the price (and should probably greet the customer) -If a volunteer is the cashier and he or she is not able to identify the price, he or she should call the manager
Use cash register to calculate the total price including tax	-Absolute -The personnel member either calculates the total price correctly or does not	-The determined price of each item should be entered into the cash register -Once the price of all of the customer's items have been entered, select the "total" button -Then, select the "tax" button to apply the sales tax to the total cost of the	-Teamwork and communication are not required for this task -If the cash register malfunctions, the

		<p>merchandise</p> <ul style="list-style-type: none"> -Very frequent task; 100% accuracy is required so that the monetary transaction is exact. However, the total cost can be reset if it was entered incorrectly -This task is not time critical unless there is a long line of customers at the checkout counter -This task should be completed while standing -The cashier must press various buttons on the cash register with a small amount of force 	<p>manager should be called</p>
<p>Collect cash or credit from customer based on the calculated cost</p>	<ul style="list-style-type: none"> -Absolute -The personnel member either collects and calculates the money received correctly or does not 	<ul style="list-style-type: none"> -The total cost of the customer's items should be read out loud to the customer (it will also appear on a small screen which the customer can view) -If cash is collected from the customer, calculate the dollar amount -If the total cost of the customer's items is less than \$10, tell the customer that a credit card will not be accepted -If a credit card is collected from the customer, bring it to the credit card machine -Very frequent task; enough accuracy is required so that the customer's credit card or cash is collected without damaging or losing it -This task is not time critical unless there is a long line of customers at the checkout counter -This task should be completed while standing -The cashier must hold out his or her hand and receive the customer's cash or credit card. The force required to support the cash or credit card is very small 	<ul style="list-style-type: none"> -Teamwork and communication are important for this task -The cashier must communicate with and work with the customer in order to ensure a successful monetary transaction
<p>If a credit or debit card is received, use the credit card machine and give the customer a receipt</p>	<ul style="list-style-type: none"> -Absolute -The personnel member either uses the credit card machine correctly and gives the customer a 	<ul style="list-style-type: none"> -Swipe the credit card in the credit card machine -Enter the total cost of the customer's items (including tax) and select "enter" -Let the credit card machine deduct the necessary funds from the credit card and then take the receipt -Have the customer sign the receipt and 	<ul style="list-style-type: none"> -Teamwork and communication are important for this task -The cashier needs to work with and communicate with

	<p>receipt if he or she requested one or does not</p>	<p>store it in the cash register</p> <ul style="list-style-type: none"> -Then, press "ok" on the credit card machine to collect another receipt -Ask the customer if he or she wants a receipt -If so, print a receipt with the cash register and hand it to the customer -If not, dispose of the receipt -Frequent task; enough accuracy is required so that the correct amount is deducted from the customer's credit card -This task is not time critical unless there is a long line of customers at the checkout counter -This task should be completed while standing -The cashier must swipe the credit card, press various buttons on the credit card machine, and must give the customer a receipt and a pen. The forces required for these actions are very small. 	<p>the customer by asking for his or her credit card, asking him or her to sign the receipt, and by asking if he or she wants a receipt</p>
<p>If cash is received, give the customer his or her change and a receipt</p>	<p>-Relative</p> <ul style="list-style-type: none"> -The personnel member must compare groups of bills and coins to determine which group is smallest and matches the dollar amount owed to the customer 	<ul style="list-style-type: none"> -Enter the amount of cash received into the cash register and press "enter" -When the cash register opens, put the cash in the cash register (the same bills and coins should be grouped together in the cash register) -Detect and perceive the amount of change in dollars on the cash register's screen -Determine the smallest group of bills or coins which match the total amount of change -Collect the determined bills or coins from the cash register and hand them to the customer -Ask the customer if he or she wants a receipt -If so, print a receipt with the cash register and hand it to the customer -If not, dispose of the receipt -Very frequent task; enough accuracy is required so that the correct change is returned to the customer -This task is not time critical unless there is a long line of customers at the checkout counter -This task should be completed while 	<ul style="list-style-type: none"> -Teamwork and communication are important for this task -The cashier needs to communicate and work with the customer when handing over the change and the receipt

		<p>standing</p> <p>-The biomechanics required for this task include pressing buttons on the cash register and moving cash, coins, and potentially a receipt between the cash register and the customer's hands. These actions require very little force.</p>	
<p>Help customer if he or she wants the purchased items bagged or wants help with bringing them to his or her vehicle</p>	<p>-Relative</p> <p>-The personnel member must compare different bags that can be used and determine which ones would work best</p>	<p>-Perceive the size and fragility of the various items the customer has purchased</p> <p>-Ask the customer if he or she wants the items to be bagged</p> <p>-If yes, compare the different kinds of bags in the checkout area and determine which ones would best hold the customer's items</p> <p>-If the customer's items are fragile or breakable, cover the items in bubble wrap or paper</p> <p>-Place the customer's items in the chosen bags</p> <p>-If the customer does not want the items to be bagged, do not bag the items</p> <p>-Ask the customer if he or she wants assistance with bringing the purchased items to his or her vehicle</p> <p>-If yes and there are multiple volunteers available, one should help carry the customer's items to his or her vehicle</p> <p>-If no, say thank you and goodbye to the customer</p> <p>-Frequent task; enough accuracy is required so that the customer's requests for bagging or assistance are fulfilled</p> <p>-This task is not time critical unless there is a long line of customers at the checkout counter</p> <p>-This task should be completed while standing</p> <p>-The biomechanics required for this task include picking up items and placing them in bags, wrapping some of the items, and lifting some of the bags or items and carrying them to a customer's vehicle. The forces required for these actions depend on the weight of the purchased items.</p>	<p>-Teamwork and communication are important for this task</p> <p>-The cashier needs to communicate with the customer when asking the customer if he or she wants the items to be bagged or if he or she wants help with carrying the items to a vehicle</p> <p>-The cashier also needs to coordinate with the customer if he or she is asked to help the customer bring the purchased items to the customer's vehicle</p>

Table G-7: Task Analysis - Task Support, Workplace Factors, Situational and Performance Shaping Factors, and Hazard Identification for Tasks of Function “Aid Customer at Checkout”

Task	Task support	Workplace Factors	Situational and Performance Shaping Factors	Hazard Identification
Perceive item and determine price of item based on tag, set price, and sale status	<ul style="list-style-type: none"> -The price sheet, which includes a list of items with set prices, should be used for this task -The sales board should also be used for this task -The price indicators on some of the items should also be used for this task -A procedure for how the checkout process should be conducted is posted next to the cash register 	<ul style="list-style-type: none"> -This task will take place behind the cash register -There is only one ingress/egress path which may be blocked by other personnel or by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers and customers in the checkout area 	<ul style="list-style-type: none"> -The customer could have intentionally or unintentionally removed the tag on an item, which would make it harder to determine the price of the item -Another factor is that the item could be on sale but the cashier forgets about the sale and determines that the price is higher than it actually is -Time pressure due to a long line of customers at the checkout counter is a factor which can cause the cashier to identify the price incorrectly 	<ul style="list-style-type: none"> -Low potential for personal injury unless a customer becomes aggressive
Use cash register to calculate the total price including tax	<ul style="list-style-type: none"> -The cash register should be used for this task -A procedure for how the checkout process should be conducted is posted next to the cash register 	<ul style="list-style-type: none"> -This task will take place behind the cash register -There is only one ingress/egress path which may be blocked by other personnel or by merchandise -The temperature and lighting should be at comfortable 	<ul style="list-style-type: none"> -A lack of power is a factor which could hinder this task because then the cash register would be inoperable -Another factor which would hamper this task is operator error with the cash register due to fatigue or forgetfulness because of dementia or another mental problem -Time pressure due 	<ul style="list-style-type: none"> -Low potential for personal injury unless a customer becomes aggressive

		<p>levels</p> <ul style="list-style-type: none"> -The noise level depends on the number of volunteers and customers in the checkout area 	<p>to a long line of customers at the checkout counter is a factor which can cause the cashier to calculate the total price incorrectly</p>	
<p>Collect cash or credit from customer based on the calculated cost</p>	<p>-A procedure for how the checkout process should be conducted is posted next to the cash register</p>	<ul style="list-style-type: none"> -This task will take place behind the cash register -There is only one ingress/egress path which may be blocked by other personnel or by merchandise -The temperature and lighting should be at comfortable levels -The noise level depends on the number of volunteers and customers in the checkout area 	<p>-Time pressure due to a long line of customers at the checkout counter is a factor which can cause the cashier to count the cash incorrectly</p>	<p>-Low potential for personal injury unless a customer becomes aggressive</p>
<p>If a credit or debit card is received, use the credit card machine and give the customer a receipt</p>	<ul style="list-style-type: none"> -The credit card machine and the cash register (for the receipt) should be used for this task -A procedure for how the checkout process should be conducted is posted next to the cash register 	<ul style="list-style-type: none"> -This task will take place behind the cash register -There is only one ingress/egress path which may be blocked by other personnel or by merchandise -The temperature and lighting 	<ul style="list-style-type: none"> -A lack of power is a factor which could hinder this task because then the credit card machine and cash register would be inoperable -A lack of receipt paper is another factor which could hamper this task because without receipt paper, a receipt cannot be printed for the 	<p>-Low potential for personal injury unless a customer becomes aggressive</p>

		<p>should be at comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the checkout area</p>	<p>customer to sign or keep</p> <p>-Another factor which would hamper this task is operator error with the credit card machine due to fatigue or forgetfulness because of dementia or another mental problem</p> <p>-Time pressure due to a long line of customers at the checkout counter is a factor which can cause the cashier to use the credit card machine incorrectly</p>	
<p>If cash is received, give the customer his or her change and a receipt</p>	<p>-The cash register should be used for this task</p> <p>-A procedure for how the checkout process should be conducted is posted next to the cash register</p>	<p>-This task will take place behind the cash register</p> <p>-There is only one ingress/egress path which may be blocked by other personnel or by merchandise</p> <p>-The temperature and lighting should be at comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the checkout area</p>	<p>-A lack of power is a factor which could hinder this task because then the cash register would be inoperable</p> <p>-A lack of receipt paper is another factor which could hamper this task because without receipt paper, a receipt cannot be printed for the customer</p> <p>-Another factor which would hamper this task is operator error with the cash register due to fatigue or forgetfulness because of dementia or another mental problem</p> <p>-Time pressure due to a long line of customers at the</p>	<p>-Low potential for personal injury unless a customer becomes aggressive</p>

			checkout counter is a factor which can cause the cashier to count the change incorrectly or use the cash register incorrectly	
Help customer if he or she wants the purchased items bagged or wants help with bringing them to his or her vehicle	<p>-A procedure for how the checkout process should be conducted is posted next to the cash register</p> <p>-Various hand carts and flatbed carts are available for this task</p>	<p>-This task will take place behind the cash register</p> <p>-Part of the task will occur outside if the cashier helps the customer bring items to his or her vehicle</p> <p>-There is only one ingress/egress path which may be blocked by other personnel or by merchandise</p> <p>-Outside, the street could be blocked by cars or trucks</p> <p>-The temperature and lighting should be at comfortable levels</p> <p>-The noise level depends on the number of volunteers and customers in the checkout area (or traffic outside)</p>	<p>-Reduced staff is a factor which can impede this task because the cashier cannot leave the cash register while there are customers in the store and if there is a line of customers, the other personnel member present will need to help bag the customers' items</p> <p>-A lack of different kinds of bags is a factor which could hamper this step because there might be items that do not fit well in the available bags</p> <p>-A crowded parking lot could also hamper this task because it would be hard to bring customers' items to their vehicles if the parking lot is packed</p> <p>-Extremely heavy merchandise is another factor which can hinder this task because the personnel may not be able to transport merchandise that is too heavy</p>	<p>-Low potential for personal injury</p> <p>-A customer could still become aggressive</p> <p>-Moving vehicles in the parking lot would act as hazards if the cashier brings items to a customer's vehicle</p>

Table G-8: Task Analysis - Narrative of Activities, Applicability of, and Time Required for Tasks of Function “Aid Customer at Checkout”

Task	Narrative of Activities	Applicability	Time Required
Perceive item and determine price of item based on tag, set price, and sale status	The cashier should first search for a price indicator on an item on the checkout counter. If a price indicator cannot be found, he or she should look at the price sheet to determine if the category of merchandise that the item falls into has set prices. Then, the cashier needs to look at the sale board and assess whether any of the sales applies to the given item. If one does, the cashier needs to calculate the new cost of the item with a calculator. Finally, if no price can be determined, the cashier needs to consult the manager (who sometimes acts as the cashier).	This task is imperative because without it, the sale of merchandise would be refuted and the store would make no profits	1 minute for each item (the cashier may need to consult the manager)
Use cash register to calculate the total price including tax	The cashier should begin by entering the price of each item into the cash register and should select “enter” after each price. After all of the prices have been entered, the cashier should select “total”. Then, the cashier should apply the sales tax to the total cost by selecting “tax”. If the cash register malfunctions during any of these steps, the manager should be called.	-This task is important because it helps eliminate human error in calculating the total cost of the customer’s items	20 seconds for each item (the cashier could enter the price incorrectly and must reset the amount in order to enter it again)
Collect cash or credit from customer based on the calculated cost	First, the cashier should read the total cost of the customer’s items to the customer. Then, the cashier should collect either cash or credit from the customer. If the total cost of the items is less than \$10, then a credit card should not be accepted because anything less than \$10 should be paid for in cash. If cash was collected, the cashier should calculate the dollar amount and make sure that it is higher than the cost of the customer’s items. If a credit or	This task is crucial because it is when money is collected from the customer and the store makes a profit	1 minute (the customer may have trouble finding money in his or her wallet or the cashier and customer may disagree about how much cash was given)

	debit card was collected, the cashier should bring it to the credit card machine.		
If a credit or debit card is received, use the credit card machine and give the customer a receipt	First, the cashier should swipe the credit card in the credit card machine. Then, he or she should enter the total cost of the customer's items (including tax) and should press "enter". Then, the cashier should wait for the credit card receipt to print and should give it to the customer to sign. The cashier should then place the signed credit card receipt under the money in the cash register and should ask the customer if he or she wants a printed receipt. If the customer does, give a receipt from the cash register to the customer. If not, dispose of the receipt.	This task is very important because a monetary transaction with a credit card cannot be completed without this step	2 minutes (the cashier may need to refill the paper for the credit card machine and may need to reset the transaction if he or she makes an error)
If cash is received, give the customer his or her change and a receipt	First, the cashier should input the amount of cash received into the cash register and should then press "enter". Then, he or she should read the amount of change owed to the customer which should appear on the cash register's screen. The cashier should then take bills and coins out of the cash register that equal the value of the change owed. The cashier should try to select the smallest combination of bills and coins in order to be most efficient. The cashier should then hand the selected bills and coins to the customer and should ask the customer if he or she would like a receipt. If the customer does, the cashier should wait for the cash register to print a receipt and should then hand it to the customer. If not, the printed receipt should be recycled.	This task is important because it allows for a successful monetary transaction if cash is received. This cash helps procure the store's profit.	1 minute (the cashier and the customer may disagree about how much change was given and the cashier may have trouble with selecting a combination of bills and coins)
Help customer if he or she	First, the cashier should look at the items the customer has purchased	This task is very important	10 minutes (the customer may have

wants the purchased items bagged or wants help with bringing them to his or her vehicle	and should determine the size and fragility of the items. Then, the cashier should ask the customer if he or she wants the items to be bagged. If the customer says yes, the cashier search the area and look for bags which would best hold the customer's items. Then, the cashier should retrieve the bags and should begin placing the items in the bags. If any of the items were determined to be fragile, the cashier should wrap them with bubble wrap or paper. If the customer did not want their items to be bagged, then the cashier should not bag them. Then, the cashier should ask the customer if he or she needs help with bringing the items or bags to his or her vehicle. If the customer says yes and more than one personnel member is present (there should always be someone at the cash register), one of the personnel members should help the customer bring his or her items to the vehicle. If the customer says no, then the cashier should say farewell and should begin helping the next customer in line.	because it deals with assisting customers. If customers are pleased with the service, they are more likely to return to the store to buy more.	many items which need to be bagged and transported to his or her vehicle with the help of personnel)
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Table G-9: Task Analysis - Estimated Workload, Number of Personnel Needed, and Knowledge and Abilities Needed for Tasks of Function "Aid Customer at Checkout"

Task	Estimated Workload (For cognitive workload, 1.4 is the minimum workload and 5 is the maximum)	Number of Personnel Needed (includes margin)	Knowledge and Abilities Needed
Perceive item and determine price of item based on tag, set price, and sale status	-Cognitive: 1.7/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	The cashier needs to be able to do basic math and should have strong situational awareness (of the sales and set prices) in order to complete this task
Use cash register to calculate the total price including	-Cognitive: 1.7/5* -Physical: Low -Overlap of task	At least 2	The cashier needs to know how to operate the cash register in order to complete this task

tax	requirements: Serial		
Collect cash or credit from customer based on the calculated cost	-Cognitive: 1.7/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	The cashier needs to be able to do count cash money in order to complete this task
If a credit or debit card is received, use the credit card machine and give the customer a receipt	-Cognitive: 1.7/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	The cashier needs to know how to operate the credit card machine to complete this task
If cash is received, give the customer his or her change and a receipt	-Cognitive: 1.7/5* -Physical: Low -Overlap of task requirements: Serial	At least 2	The cashier needs to be able to count cash money and needs to know how to operate the cash register to complete this task
Help customer if he or she wants the purchased items bagged or wants help with bringing them to his or her vehicle	-Cognitive: 2.3/5 -Physical: Moderate (If the customer needs help with bringing the items to his or her vehicle, then the items are probably heavy) -Overlap of task requirements: Serial	At least 3	The cashier needs to have strong situational awareness in order to select the appropriate bags. The cashier should also be aware of how to bag items correctly (ie. shoes go on bottom and fragile items should be wrapped). At least one personnel member present should also be strong enough to carry a customer's items

Section G.5: Questionnaire for Function "Aid Customer at Checkout"

Method Used: Talk-Through Walk-Through

Manager:

-Is there an established plan for conducting the checkout process?

There is a plan. The plan first calls for the customer to put items on counter and identify what he or she wants. It then calls for the personnel member to conduct the monetary exchange for each item, which includes applying tax, collecting money from the customer, and returning change.

-What do you do when a customer puts the merchandise they plan to buy on the counter?

He identifies the price of each item and enters the price of each item into the cash register.

-What factors may make it hard to identify the price of the items the customer wants to buy?

One factor that could make it hard to identify the price is that the customer may have either intentionally or unintentionally removed the tag or may not understand the price of the items.

-What happens if the price of an item at checkout cannot be determined?

The sale is refuted and the manager is usually consulted.

-Do you have the authority to decide what the price should be if there is a conflict?
He does have this kind of authority.

-What are some factors that may make it hard to use the cash register successfully?
One obvious factor is a lack of power. Another factor could be a lack of paper for receipts. Operator error also occurs frequently because some of the cashiers have dementia due to their age and forget how to use the cash register properly.

-What are some factors that may make it hard to use the credit card machine successfully?
The same factors which apply to the cash register, including a lack of power, a lack of paper, and operator error, also apply to the credit card machine.

-What is your response if the cash register or card machine breaks or loses power?
He will do an assessment to find out what is wrong with either machine, and will address the issue in a constructive way.

-Do you follow a plan which describes how items should be bagged?
He does not and relies on his common sense when bagging items. For example, he knows that he should wrap fragile items and put shoes at the bottom of a bag.

-What factors can lead to a situation where items are bagged incorrectly or are not bagged when they should be?
One factor is a lack of staffing because if there is only one personnel member at the cash register, he or she may not be able to bag items if he or she gets overwhelmed by a line of customers. Another factor is if a customer forgets to tell the personnel member that he or she wants his or her items to be bagged.

-What kinds of bags and other tools does the store have that facilitate the checkout process?
The store has a supply of recycled plastic and paper bags of various sizes that can facilitate the checkout process.

-What factors may prevent you from helping customers transport heavy items to their vehicles?
He cannot think of any factors which prevent him from helping customers in this way.

-If you had to help a customer check out, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?
Very little

-If you had to help a customer check out, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?
Little

-Have there been any instances the price of an item that a customer wanted to buy could not be determined? Why?
Yes. There have been many instances where the price tags on antique items were removed which made it impossible to determine their price.

-Have there been any instances where the monetary exchange was unsuccessful? Why?

Yes. There have been multiple instances where counterfeit bills or cancelled credit or debit cards were used.

-Have there been instances where a customer was unhappy with the checkout process? Why?
Yes. Some customers have been unhappy with the price or quality of items they wanted to buy. They have also been upset about missing price tags, long lines, and discounts which they thought applied to them.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when helping a customer check out?

1

-About how much time would it take you to help a customer check out?
It would take him about 2 minutes.

Volunteer 1:

-What are the different tasks that you perform in the store?
She acts as the cashier and also displays items in the store.

-What factors may make it hard to identify the price of the items the customer wants to buy?
One factor is if there is no tag on the item when it is put on the counter for checkout. Another factor that could make it hard to identify the price is if the item is on sale and the cashier forgets about the sale.

-Is there a plan you should follow for conducting the checkout process?
There is a written plan for how to conduct the checkout process.

-What factors might make it hard to successfully collect cash or credit from the customer and then return the correct amount of change?
The biggest factor is if the cash register does not contain enough bills or coins of different values.

-Have you ever had any issues with the cash register or card machine? If so, can you identify the cause of them?
She has not.

-How problematic can a language barrier between a customer and yourself be during the checkout process?
She thinks that it could be fairly problematic.

-Is there a plan you should follow for bagging the customer's items?
She is not aware of such a plan.

-What factors can lead to a situation where items are bagged incorrectly or are not bagged when they should be?
One factor is if the store does not have bags of the size needed for specific items.

-When do you help a customer bring items to his or her vehicle following check out?
She does not because she lets the manager assist customers in this way.

-How much experience have you had with running the cash register and helping customers check out?

She has had 6 months of experience with running the cash register and helping customers check out.

-If you had to help a customer check out, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Moderate

-If you had to help a customer check out, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-Do you know what to do if the cash register or card machine is not functional?

She calls the manager when the cash register or card machine is not functional.

-What are some factors that may make it difficult to use the cash register successfully? How will they make it more challenging?

Not having enough spare bills or coins is a factor that could make it more difficult to use the cash register successfully because the cash register expects the personnel member to give exact change to the customer.

-What are some factors that may make it difficult to use the card machine successfully? How will they make it more challenging?

One factor is that sometimes the credit or debit card the customer uses has been cancelled and is thus void.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when helping a customer check out?

2

-About how much time would it take you to help a customer check out?

It would take her about 5 minutes.

Volunteer 2:

-What are the different tasks that you perform in the store?

She runs the cash register, distributes items in the thrift store, and cleans.

-What factors may make it hard to identify the price of the items the customer wants to buy?

One important factor is if some of the items do not have price tags attached to them.

-Is there a plan you should follow for conducting the checkout process?

She is not aware of a plan but has a routine she usually follows.

-What factors might make it hard to successfully collect cash or credit from the customer and then return the correct amount of change?

She cannot think of any.

-Have you ever had any issues with the cash register or card machine? If so, can you identify the cause of them?

She has not had any issues with either.

-How problematic can a language barrier between a customer and yourself be during the checkout process?

A language barrier can be an issue but she usually asks for a customer who knows English to interpret the language (usually Spanish) for her.

-Is there a plan you should follow for bagging the customer's items?

She is not aware of such a plan.

-What factors can lead to a situation where items are bagged incorrectly or are not bagged when they should be?

She cannot think of any because the customer is usually the one who makes the decision regarding how the items are bagged.

-When do you help a customer bring items to his or her vehicle following check out?

She does not help customers bring items to their vehicles.

-How much experience have you had with running the cash register and helping customers check out?

She has had 6 or 7 years of experience with running the cash register and helping customers check out.

-If you had to help a customer check out, would you say the level of conscious mental effort or concentration required is very little, moderate, or extensive?

Very little

-If you had to help a customer check out, would you say the level of confusion, risk frustration, or anxiety is little, moderate, or high to very intense?

Little

-Do you know what to do if the cash register or card machine is not functional?

She does not and would call the manager.

-What are some factors that may make it difficult to use the cash register successfully? How will they make it more challenging?

She cannot think of any other than normal human error.

-What are some factors that may make it difficult to use the card machine successfully? How will they make it more challenging?

She cannot think of any other than normal human error.

-On a scale of 1 to 5 where 5 is the most, how much time pressure would you feel when helping a customer check out?

1

-About how much time would it take you to help a customer check out?

It could take her anywhere from 1 minute to 10 minutes