Overview of NGN Scoring

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Dichotomous Scoring

❑ What is Dichotomous Scoring?

A scoring approach in which the response to an item or task is always scored as either correct or incorrect, regardless of the task's complexity or any indication of partial knowledge or understanding in the response (IGI Global, 2022).

❑ Example:

Multiple-choice items that require the test takers to select the single best answer. The answers are scored as correct or incorrect. Credit is only given for the correct answer.

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Polytomous Scoring

❑What is Polytomous Scoring?

A scoring approach in which the response to a multicomponent task is awarded partial credit in accordance with the application of an evaluation function appropriate for the underlying task type (IGI Global, 2022).

❑Example:

Scoring rubrics

Scoring Rubric	
Points	**Description**
4	• Students understanding of concept if clearly evident • Student uses effective strategies to get accurate results • Student uses logical thinking to arrive at conclusion
3	• Students understanding of the concept is evident • Student uses appropriate strategies to arrive at a result • Student shows thinking skills to arrive at conclusion
2	• Student has limited understanding of a concept • Student uses stratgies that are ineffective • Student attempts to show thinking skills
1	• Student has a complete lack of understanding of concept • Student makes no attempt to use a strategy • Student shows no understanding

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Single Select Multiple-Choice (SSMC)

SSMC items have been used on exams for decades.

- reasonably well known
- basic in structure
- basic functionality required to provide a response
- relatively easy to generate
- easy to read
- easy to score

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Alternate Item Formats

Other item types have been generated with the goal to address concepts and content deemed more complex than a SSMC item can measure.

- hot spot
- graphic response
- ordered response
- numeric response
- select all that apply

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New Scoring Rules for NGN Items

Clinical judgment is a complex construct, and it is complex to measure.

Two new scoring rules have been created for the NGN items so that the points the items contribute to an exam score match the complex nature of the construct.

- Zero-One (0/1)
- Plus-Minus (+/-)
- Rationale

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Zero-One (0/1) Scoring

- a classic approach to scoring questions
- one point for each correct response
- no points for incorrect responses
- total score is the sum of all correct responses
- NGN item types using zero-one scoring:
    1. Drop-down table
    2. Drop-down cloze
    3. Drag and drop cloze
    4. Multiple Response Select "N"
    5. Matrix multiple choice
    6. Bowtie

0/1 Scoring Example: Matrix Multiple Choice

- Select only one option in a row
- Each row is scored independently with the 0/1 scoring
- The total score for the item is the sum of the scores over the rows
- The maximum score is the total number of rows provided

Matrix Multiple Choice

For each potential provider's prescription, click to specify if the potential prescription is **essential, nonessential, or contraindicated** for the client.

Intervention	Key			Student Response				
	Essential	Nonessential	Contraindicated	Essential	Nonessential	Contraindicated		
Initiate oxygen	⊠	☐	☐	⊠	☐	☐	Correct	+1
Perform chest percussion	☐	☐	⊠	⊠	☐	☐	Incorrect	0
Administer short acting bronchodilator	⊠	☐	☐	☐	☐	⊠	Incorrect	0
Administer a corticosteroid	⊠	☐	☐	⊠	☐	☐	Correct	+1
Administer an antipyretic	☐	⊠	☐	☐	⊠	☐	Correct	+1

Item Score   3

Plus-Minus (+/-) Scoring

- earns points for selecting correct information
- loses points when selecting incorrect information
- Score sums that result in negative numbers default to zero
- The following NGN item types use plus-minus scoring:
    1. Highlight text
    2. Highlight table
    3. Matrix multiple response
    4. Multiple response grouping
    5. Multiple Response Select "all that apply"

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+/- Scoring Example: Matrix Multiple Response

- To decide if each client finding is consistent with each of three disease processes
- Award a point for selecting the most relevant information
- Item score is offset (i.e., receives penalty) for endorsing incorrect information
- Option scores are derived from student responses in a column
- No negative scores; summed scored for a column that are less than 0 default to zero.

Matrix Multiple Response

For each client finding below, click to specify if the finding is consistent with the disease process of cystic fibrosis, pneumonia, and asthma.

Assessment Finding	Key			Student Response		
	Cystic Fibrosis	Pneumonia	Asthma	Cystic Fibrosis	Pneumonia	Asthma
Shortness of Breath	☐	☒	☐	☐	☐	☒
Oxygen saturation	☒	☐	☒	☒	☒	☒
Wheezing	☒	☐	☒	☒	☒	☒
Nonproductive cough	☒	☒	☒	☒	☒	☒
Pulse rate	☐	☒	☒	☐	☐	☒
Respiratory rate	☐	☐	☒	☐	☐	☒
retractions	☐	☒	☒	☐	☒	☐

Column 1 1 +1 +1   3

Column 2 -1 -1 -1 +1 -1 +1   0

Column 3 -1 +1 +1 +1 +1 +1 -1   3

Item Score   6

No negative scores. Sums less than zero default to zero.

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Rationale Scoring

- Require to have full understanding of paired information (e.g., cause-and-effect), because the concepts measured by the item require justification through a "rationale".
- For example, a nurse must do X because of Y.
- To earn points, both X and Y must be correct.
- The following NGN item types use rationale scoring:
  1. Drop-down rationale
  2. Drag and drop rationale

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Rationale Scoring Example: Drop-Down Rationale

- drag the condition the client is at risk for developing as evidence by the client's status
- award a point for correctly identifying the cause-effect information
- must correctly identify the cause-effect relationship dyad to receive a point

Drop Down Rationale

Complete the following sentence by choosing from the lists of options.

The client is at highest risk for developing

Select
Pneumonia
COPD
Sepsis
Venous Thrombosis
Pulmonary emboli

as evidenced by the client's

Select
...respiratory status
...cardiac status
...immune status
...age

Student Response
COPD

Student Response
... respiratory status

as evidenced by → Dependency or Cause-and-effect

Drop-down 1	Incorrect	0
Drop-down 2	Correct	+1
Cause-and-effect	**Item Score**	0
(Drop-down 1 & Drop-down 2)		

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ATI NGN Item Scoring Guide

Type of NGN Question	Description	Scoring
Bow Tie (Not used in Case Study)	Presents a clinical scenario in a medical record format. Drag each response from color-coded word choice boxes to the targets in the corresponding answer sections. Choose two responses from first column, one response from middle column, two responses from third column. Always a standalone item.	(0/1)
Drag-and-Drop Cloze	Presents information in sentence format. Contains one to five answer spaces, or targets, that represent a missing word or short phrase. Drag answers from associated word choice box to targets. Word choice box contains four to 10 word choices. Word choice box always includes more word choices than available targets. Can be case study or standalone item.	(0/1)
Drag-and-Drop Rationale	Presents information in a single sentence. Sentence contains two targets (dyad) or three targets (triad). Select answers from corresponding word boxes and drag to appropriate targets. Can be case study or standalone item.	(R)
Drop-Down Cloze	Presents information in sentence format. Contains two to five drop downs that represent missing information in the form of a word or short phrase; each drop down has three to five options. Select option from each drop down to complete sentence. Can be case study or standalone item.	(0/1)
Drop-Down Rationale	Presents information as a single sentence; contains two drop downs (dyad) or three drop downs (triad) that represent missing information in the form of a word or short phrase. Select option from each drop to down to complete sentence. Can be case study or standalone item.	(R)
Drop-Down Table	Presents information in a table containing at least one column and three rows. Each row has one drop down that represents missing information. Select option from each drop down to complete sentence. Can be case study or standalone item.	(0/1)
Highlight Table	Presents information in a table that contains one to five rows. Up to 10 segments of text in the table will be highlighted as selectable options. Click on highlighted segments of text to select answer(s). Can be a case study or standalone item.	(+/-)
Highlight Text	Presents information in a sentence or paragraph format that may contain a bulleted list. Up to 10 segments of text in the table will be highlighted as selectable options. Click on highlighted segments of text to select answer(s). Can be case study or standalone item.	(+/-)
Matrix Multiple Choice	Presents information in a table containing two to three columns and four to 10 rows. Each row contains a single correct answer. The number of correct answers in each column is not considered for this item type. Click button in appropriate column of table to provide answer. Can be case study or standalone item.	(0/1)
Matrix Multiple Response	Presents information in a table containing two to 10 columns and four to seven rows. Each column contains one to 10 correct answers. The number of correct answers in each row is not considered for this item type. Click the checkbox(es) in the appropriate row(s) of the table to provide answer(s). Can be case study or standalone item.	(+/-)
Multiple Response Grouping	Presents information in a sentence format with two to five small groups of options. Each group contains two to four options with one to four correct answers. Select one to all options in each group to answer the item. The number of correct answers in each group might not be the same. Can be a case study or standalone item.	(+/-)
Multiple Response Select All That Apply	Presents information in a sentence format with a list of options, similar to a traditional multiple-choice item. In this item type, there are five to 10 options. Select one to all options to answer the item. Can be case study or standalone item.	(+/-)
Multiple Response Select "N"	Presents information in a sentence format with a list of five to 10 options. Number of correct answers is indicated in the presented information. Select appropriate number of options to answer item. Can be case study or standalone item.	(0/1)

Scoring Rule	Explanation
Zero-one (0/1)	Candidates earn one point for each correct response and are not penalized for incorrect responses. If it is a multi-point item, 0/1 scores are summed together to get the item total score.
Plus-minus (+/-)	Candidates earn one point for each correct response and lose one point for each incorrect response. If it is a multi-point item, +/-1 scores are summed together to get the item total score. If the summed value is negative, the final score will be truncated to 0.
Rationale Scoring (R)	Candidates earn one point when both responses in a paired set are answered correctly.

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NCLEX and NGN Emphasis: Setting Expectations

The NGN Test Specifications Include:

- The number of items is the same for RN and PN exams.
- Candidates will receive 15 pretest (unscored) items.
- The minimum number of scored items is 70 (total exam length: 85) and the maximum is 135 (150).
- Similar exam time and # of items between NGN and current NCLEX: Exam time is five hours. Item response time: ~1-2 minutes/item

https://www.ncsbn.org/SummaryofModificationstoNCLEX.pdf

Minimum Length Exam 70 (85)

✓ NGN Items (18)/70 = 25.7%

      3 Case Studies (6 items per)

✓ Traditional Items (52)/70 = 74.3%

Maximum Length Exam 135 (150)

✓ NGN Items (25)/135 = 18.5%

      3 Case Studies (6 items per)
      Stand Alone Items (7)

✓ Traditional Items (110)/135 = 81.5%

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Coming soon, ATI will provide new instructional videos to highlight the new NGN items and their associated scoring rules.

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Other NGN Item Types Using 0/1 Scoring

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Drop-Down Table – Apply the Zero-One (0/1) Scoring Rule

Zero-one scoring is applied to the drop-down table item. For the item shown students are prompted to specify the potential nursing intervention that would be appropriate. For each drop-down a student earns 1 point for the correct response and earns 0 points for an incorrect response. Sum the score over the rows to get the total score of the item. Calculate the zero-one score for the item shown as follows: 1 + 0 + 1 = 2.

Drop Down Table

For each body system below, click to specify the potential nursing intervention that would be appropriate for the care of the client. Each body system may support more than 1 potential nursing intervention.

Body System	Potential Nursing Interventions
1. Respiratory	Select - Apply Oxygen - Initiate continuous pulse Oximeter - Administer bronchodilator
2. Cardiac	Select - Walk hallways 3 times per day - Place the client on EKG monitoring - Obtain pulse rate every hour
3. Immune	Select - Administer prednisone - Administer acetaminophen - Initiate IV antibiotic

Student Response			
Body System	Potential Nursing Interventions		
1. Respiratory	- Initiate continuous pulse oximeter	Correct	1
2. Cardiac	- Place the client on EKG monitoring	Incorrect	0
3. Immune	- Administer prednisone	Correct	1
		Item Score	2

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Drop-Down Cloze – Apply the Zero-One (0/1) Scoring Rule

For the item shown students are asked to complete the sentence using two drop down lists. Zero-one scoring is applied to the drop-down cloze item. A student will get a point for each option they get correct. Calculate the zero-one score for the item shown as follows: 1 + 0 = 1. NOTE: For the drop-down cloze item there is no dependency between the drop-down options for scoring.

Drop Down Cloze

Complete the following sentence by choosing from the lists of options.

The nurse should first

Select
initiate oxygen
offer oral fluids
administer acetaminophen
Initiate IV bolus

Student Response
Select
initiate oxygen

Correct   +1

Followed by

Select
Administer albuterol
Teach about trigger prevention
Obtain vital signs
Administer Methylprednisolone

Student Response
Select
Obtain vital signs

Incorrect   0

Item Score   1

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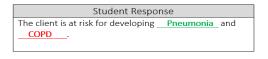## Drag and Drop Cloze – Apply the Zero-One (0/1) Scoring Rule.

For the drag and drop cloze item shown students are asked to drag from the choices provided to indicate which conditions the client is at risk for developing. There are eight choices the student can select from and there are two targets within the sentence. With zero-one scoring, a student is awarded a point for selecting the most relevant information and zero points for endorsing incorrect information. Each target is worth one point if the correct answer is provided by the student. Calculate the zero-one score for the item as follows: $1 + 0 = 1$.

Drag and Drop Cloze

Drag words from the choices below to fill in each blank in the following sentence.

The client is at risk for developing __(Target 1)__ and __(Target 2)__.

Word Choices	(Key)
1.	Pneumonia
2.	COPD
3.	Sepsis
4.	Venous Thrombosis
5.	Pulmonary emboli
6.	Lung Cancer
7.	Asthma
8.	Allergies

Student Response
The client is at risk for developing __Pneumonia__ and __COPD__.

Target 1	Correct	+1
Target 2	Incorrect	0
	Item Score	**1**

Multiple Response Select "N" – Apply the zero-one (0/1) scoring rule.

For the multiple response select "N" item shown students are prompted to "Select 5 findings that require immediate follow up". The zero-one scoring rule should be used. The student is awarded a point for selecting each correct response and zero points for selecting incorrect responses. Calculate the zero-one score for the item shown as follows: $1 + 0 + 1 + 0 + 0 = 2$.

Multiple Response Select N

Select the 5 findings that require immediate follow-up.

Option	Key
Oxygen saturation	☒
Respiratory rate	☒
Length of exposure time to cats	☐
Family history of allergies to cats	☐
Heart rate	☒
Lung sounds	☒
Temperature	☒
Blood pressure	☐

Student Response		
☒	Correct	+1
☐	Incorrect	0
☐		
☐		
☒	Correct	+1
☐	Incorrect	0
☐	Incorrect	0
☒	Incorrect	0
	Item score	**2**

Bowtie

The nurse assesses the client and notes the changes in the client's condition.

Complete the diagram by dragging from the choices below to specify what condition the client is most likely experiencing, 2 actions the nurse should take to address that condition, and 2 parameters the nurse should monitor to assess the client's progress.

Action to Take		Parameter to Monitor
	Condition Most Likely Experiencing	
Action to Take		Parameter to Monitor

KEY

Actions to Take	Potential Condition	Parameters to Monitor
Stop the blood transfusion	Hypothyroidism	Jugular vein distention
Assist the client with coughing and deep breathing	Blood transfusion reaction	Body temperature
Obtain blood samples from the client	Acute myocardial infarction	Pain level
Place the client's feet in a dependent position	Cirrhosis	Free T4 levels
Repeat Troponin level X 3		Breath sounds

For the bowtie item shown students are asked to complete the diagram by dragging choices to specify which conditions the client is most likely experiencing, two actions the nurse should take to address that condition and two parameters the nurse should monitor. Calculate the zero-one score for the item as follows: 1 + 1 + 1 + 0 + 1 = 4.

Student Response		
Stop the blood transfusion		Breath sounds
	Blood transfusion reaction	
Obtain blood samples from the client		Jugular vein distention

Correct   Correct

Correct

Incorrect   Correct

NOTE: Bowtie item is stand alone and not to be used within a case study.

Correct	+1
Correct	+1
Correct	+1
Incorrect	0
Correct	+1
Item Score	**4**

Other NGN Item Types Using +/- Scoring

Highlight Text – Apply the Plus-Minus (+/-) Scoring Rule.

For the highlight text item shown students are asked to highlight the findings that indicate the client is not progressing as expected. Calculate the plus-minus score for the item as follows: 1 - 1 + 1 - 1 = 0.

NOTE: Ensure that your students know what text comprise each option if the text wraps to another line. An option does not need to be a full sentence.

Highlight Text

The nurse is reviewing the progress note.

Click to highlight the findings below that would indicate the client is not progressing as expected.

1400: The client has received 2 doses of albuterol @ 1245 and 1330. Wheezing throughout with slight stridor. Oxygen via face mask @ 3 L with oxygen saturation of 89%. Respiratory rate ranges from 28-30/min. Temperature 102.5°F, acetaminophen given at 1330. IV bolus completed @ 1345. Methylprednisolone initiated.

Student Response

1400: The client has received 2 doses of albuterol @ 1245 and 1330. Wheezing throughout with slight stridor. Oxygen via face mask @ 3 L with oxygen saturation of 89%. Respiratory rate ranges from 28-30/min. Temperature 102.5°F, acetaminophen given at 1330. IV bolus completed @ 1345. Methylprednisolone initiated.

Correct	+1
Incorrect	-1
Correct	+1
Incorrect	-1
Item Score	**0**

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Highlight Table – Apply the Plus-Minus (+/-) Scoring Rule.

For the highlight table item shown students are asked to highlight the findings in the table that require follow-up by the Nurse. With plus-minus scoring, a student is awarded a point for selecting the most relevant information and the item score is offset (the student receives a penalty) for endorsing incorrect information. No negative scores are given to students. Summed scores that are less than zero default to zero.
Calculate the plus-minus score for the item as follows: 1 + 1 + 1 + 1 - 1 + 1 = 4.

Highlight Table

Click to highlight below the findings that require immediate follow-up.

Body System	Findings
Respiratory	- Oxygen saturation - Respiratory rate - Lung sounds
Cardiac	- Pulse Rate - Blood pressure - Heart sounds
Immune	- WBC - Client temperature - allergies

Student Response		
Body System	Findings	
Respiratory	- Oxygen saturation	Correct +1
	- Respiratory rate	Correct +1
	- Lung sounds	Correct +1
Cardiac	- Pulse Rate	Correct +1
	- Blood pressure	
	- Heart sounds	Incorrect -1
Immune	- WBC	Correct +1
	- Client temperature	
	- allergies	
	Item Score	**4**

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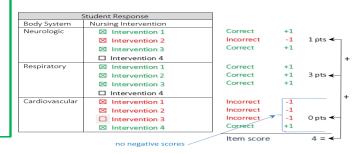## Multiple Response Grouping – Apply the Plus-Minus (+/-) Scoring Rule.

For the multiple response grouping item shown students are asked to identify the nursing intervention that would be appropriate for the care of the client. For the multiple response grouping item plus-minus scoring is used. Plus-minus scoring is applied within a grouping and then grouping scores are summed to provide the item score. Within a grouping, a student is awarded a point for selecting the most relevant information and the grouping score is offset (the student receives a penalty) for endorsing incorrect information. No negative scores are given to students. Summed grouping scores that are less than zero default to zero.

Multiple Response Grouping

For each body system below, click to specify the potential nursing intervention that would be appropriate for the care of the client. Each body system may support more than one potential nursing Intervention.

Body System	Nursing Intervention
Neurologic	☒ Intervention 1
	☐ Intervention 2
	☒ Intervention 3
	☐ Intervention 4
Respiratory	☒ Intervention 1
	☒ Intervention 2
	☒ Intervention 3
	☐ Intervention 4
Cardiovascular	☐ Intervention 1
	☐ Intervention 2
	☒ Intervention 3
	☒ Intervention 4

Calculate the plus-minus score for the item as follows:

	Student Response			
Body System	Nursing Intervention			
Neurologic	☒ Intervention 1	Correct	+1	
	☒ Intervention 2	Incorrect	-1	1 pts
	☒ Intervention 3	Correct	+1	
	☐ Intervention 4			
Respiratory	☒ Intervention 1	Correct	+1	
	☒ Intervention 2	Correct	+1	3 pts
	☒ Intervention 3	Correct	+1	
	☐ Intervention 4			
Cardiovascular	☒ Intervention 1	Incorrect	-1	
	☒ Intervention 2	Incorrect	-1	
	☐ Intervention 3	Incorrect	-1	0 pts
	☒ Intervention 4	Correct	+1	
	Item score		4 =	

no negative scores

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Multiple Response Select "All That Apply" – Apply the Plus-Minus (+/-) Scoring Rule.

For the multiple response select "all that apply" item shown students are asked to identify the assessment findings tha require follow-up by the Nurse. With plus-minus scoring, a student is awarded a point for selecting the most relevant information and the item score is offset (the student receives a penalty) for endorsing incorrect information. No negative scores are given to students. Summed scores that are less than zero default to zero.
Calculate the plus-minus score for the item as follows: 1 - 1 + 1 + 1 - 1 = 1.

Multiple Response Select all that apply

Which of the following assessment findings require follow-up by the nurse? **Select all that apply**

Option	Key
1. Oxygen Saturations	☒
2. Heart rate	☒
3. Blood pressure	☐
4. Hemoglobin results	☒
5. Pulse	☐
6. Lung sounds	☒
7. Mental status	☒
8. Temperature	☐

Student Response			
Option	Key		
1. Oxygen Saturations	☒	Correct	+1
2. Heart rate	☐	Incorrect	-1
3. Blood pressure	☐		
4. Hemoglobin results	☒	Correct	+1
5. Pulse	☐		
6. Lung sounds	☒	Correct	+1
7. Mental status	☐	Incorrect	-1
8. Temperature	☐		
		Item Score	1

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Other NGN Item Types Using Rationale Scoring

Drag-and-Drop Rationale – Apply the Rational Scoring Rule.

For the drag-and-drop rationale item shown students are asked to drag the condition the client is at risk for developing due to the finding the client exhibits. With rationale scoring, a student is awarded a point for selecting both the correct condition and the correct finding. In the drag-and-drop rationale item the student must correctly identify the cause-and-effect relationship dyad to receive a point.

If two finding-targets are listed a response tryad is created. With a tryad, there are two cause-and-effect relationships that need to be identified. If the student correctly identifies the condition and both findings, two points are awarded. If the student correctly identifies the right condition and one finding, the student is awarded one point. If the student incorrectly identifies the condition, but correctly identifies both findings, no points are awarded.

Drag 1 condition and 1 client finding to fill in each blank in the following sentence.

The client is at risk for developing _____(Target 1)_____ due to _____(Target 2)_____.

Drag 1 condition and 1 client finding to fill in each blank in the following sentence.

The client is at risk for developing _____(Target 1)_____ due to _____(Target 2)_____ and _____(Target 3)_____.

Dyad Example

Drag and Drop Rationale

Drag 1 condition and 1 client finding to fill in each blank in the following sentence.

The client is at risk for developing _____ (Target 1) _____ due to _____ (Target 2) _____.

Condition	Client Finding
Condition 1	Finding 1
Condition 2	Finding 2
Condition 3	Finding 3
Condition 4	Finding 4
Condition 5	Finding 5

Dependency or Cause-and-effect

Student Response

The client is at risk for developing __Condition 5__ due to __Finding 5__.

Target 1	**Incorrect**	**0**
Target 2	**Correct**	**+1**
Cause-and-effect (Target 1 & Target 2)	**Item Score**	**0**

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Tryad Example

Drag and Drop Rationale

Drag 1 condition and 1 client finding to fill in each blank in the following sentence.

The client is at risk for developing _____ (Target 1) _____ due to _____ (Target 2) _____ and _____ (Target 3) _____.

Condition	Client Finding
Condition 1	Finding 1
Condition 2	Finding 2
Condition 3	Finding 3
Condition 4	Finding 4
Condition 5	Finding 5

Student Response

The client is at risk for developing __Condition 3__ due to __Finding 5__ and __Finding 4__.

Cause-and-effect 1 (Target 1 & Target 2)	**Incorrect**	**0**
Cause-and-effect 2 (Target 1 & Target 3)	**Correct**	**+1**
	Item Score	**1**

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