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Evaluating a Statistical-Based Assessment Tool for Stratifying Risk among U.S. Air Force Organizations

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EVALUATING A STATISTICAL-BASED ASSESSMENT TOOL FOR STRATIFYING RISK AMONG U.S. AIR FORCE ORGANIZATIONS

THESIS

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Abstract

The Air Force Inspection System is a proponent of utilizing a risk-based sampling strategy (RBSS) for conducting inspections from major command levels down to the unit level. The strategy identifies areas deemed most important or risky by commanders and prioritizes them accordingly for an independent assessment by the Inspector General. While Air Force regulation specifies the need to use a RBSS for inspection, the implementation process is delegated to individual commands and, subsequently, wings. The 23rd Wing, the sponsor for this research, directed us to analyze a RBSS tool highlighted as an example from which to adopt for those units within Air Combat Command, the major command for the 23rd. Our analysis entailed both descriptive and inferential measures. The results identified some potential shortfalls for which solutions were proposed. The recommended measures include using a median-based metric instead of a mean-based metric to score risk for organizations, a 3-point Likert scale to evaluate criteria, as well as a scoring system for dichotomous criteria when mixing with either a 3-, 4-, or 5-point Likert scale criteria.

Acknowledgments

First and foremost, I would like to express my deepest appreciation to my advisor and committee chair, Dr. Edward D. White, without whom this thesis would not be possible. Dr. White's patience, guidance, and feedback has been instrumental throughout my research journey. Special thanks to my committee members, Dr. John J. Elshaw and Lt Col Clay M. Koschnick, for fine-tuning my thesis with their knowledge and expertise. Additionally, I would like to acknowledge my research sponsor, the 23rd Wing, as well as various members of the Inspector General community to include Air Combat Command, 129th Rescue Wing, 163rd Attack Wing, and 366th Fighter Wing for providing crucial information about my research topic. Finally, I would like to thank my friends, family, and running team for their continual encouragement and support.

Tiffany A. Low

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EVALUATING A STATISTICAL-BASED ASSESSMENT TOOL FOR STRATIFYING RISK AMONG U.S. AIR FORCE ORGANIZATIONS

I. Introduction

Problem Statement

According to Air Force Instruction 90-201 (2018), the Air Force Inspection System uses a risk-based sampling strategy for conducting inspections from major command levels down to the unit level. While Air Force regulation specifies the need to use a risk-based sampling strategy (RBSS) for inspection, the implementation process is delegated to individual wings. Without a standardized template from which different units build their tailored strategy, the tools in use can differ drastically across units. Currently the 23rd Wing, the sponsor for this research, uses a risk matrix or heat map to determine which programs or organizational units the wing commander deems as riskiest. However, another organizational unit within Air Combat Command (ACC), 129th Rescue Wing, has a tool that ACC distributes as an example. Our research examines the sample tool currently used and its efficacy.

Background

According to the 23rd Wing Director of Inspections, ACC does not have a unified, quantitative method for implementing their RBSS. Risk-based sampling strategy is defined as "a methodology employed to inspect areas deemed most important by commanders and functional area managers requiring an independent assessment by the Inspector General (IG)" (AFI 90-201, 2018). In other words, it is a decision analysis approach that prioritizes which programs and processes get inspected by the local Inspector General based on its risk to the mission. Since some ACC bases do not have a defined or acceptable RBSS process in place, Headquarters ACC shared an example used by the 129th Rescue Wing for units under its command.

Research Questions and Data

While different units have the flexibility to create their own RBSS that may meet Air Force regulation on the surface, we need to assess whether current tools in use truly meet the intent of a RBSS. We analyze the existing tools, identify shortfalls, and remedy any issues. Our research seeks to answer the following questions:

1. What are the current processes different inspection teams use for their risk-based sampling strategy?
2. What is the validity of the current risk-based sampling strategies?
3. What may be done to correct or improve the current risk-based sampling strategies?
4. What may be a better tool to use for a risk-based sampling strategy?
5. How can we create a product that is simple to use and explain to users?

We are given two sets of data: one created by the 23rd Wing and one used by the 129th Rescue Wing (RQW) as the ACC RBSS example. Through information tracing, we discovered that the 129th RQW modified a spreadsheet from the 163rd Attack Wing (ATKW), which also modified a tool received from ACC IG believed to originate from the 366th Fighter Wing (FW). We describe how each risk-based sampling strategy is currently employed and identify any shortfalls of the current tools in use, focusing primarily on the 129th RQW RBSS tool since it is an ACC model.

Methodology

First, we examine our data, which are the tools the 23rd Wing currently uses and the one used by the 129th Rescue Wing that ACC views as a benchmark process. Since the 129th RQW is not the originator of their tool, we also consider the preceding tools used by the 163rd ATKW and possibly the 366th FW which serves as the foundational framework for the 129th RQW tool. We then identify any issues with the current tool and propose adjustments. We explore patterns in actual RBSS data to determine what variables and limits to use when generating data simulations. Through simulation, we highlight the different results using existing tools versus the modified tools. Comparing the results determine which tool better meets the intention of a risk-based sampling strategy.

Thesis Organization

This thesis is organized into five chapters. Chapter 1 introduces the research topic and questions. Chapter 2 reviews the history of the IG process, background information on RBSS including examples of RBSSs in use. Chapter 3 discusses the methodology and data used to investigate our research questions. Chapter 4 presents the analysis and results. Chapter 5 summarizes and discusses conclusions and presents possible recommendations for future research.

II. Literature Review

Chapter Overview

This chapter provides relevant history of the Air Force inspection system, its revision resulting in the need for a risk-based sampling strategy (RBSS), the existing RBSS tool used by the 23rd Wing and the current RBSS tool serving as Air Combat Command's example. This chapter defines what a risk-based sampling strategy is and further highlights current processes used to meet its intent.

Relevant History

When the Air Force was established in 1947, there were six types of inspections; however, by 2010, the Air Force, Department of Defense and other government agencies were conducting over 97 different types of inspections, assessments, and evaluations, leaving a commander less than 50% of days in a year to focus solely on the mission (Camm et al., 2010).

In 2010, the Office of the Secretary of the Air Force, Inspector General created an Inspection System Improvement Tiger Team tasked to improve inspection policy and to reduce the burden on inspected units while improving the quality of relevant information generated for Air Force leadership (Camm et al., 2010). Factors such as budget constraints, reduced staffing, and increased taskings revealed that the old inspection system was unsustainable (Rogers, 2012). In preparation for an inspection, some units perceived the need to "paint their grass green," shifting valuable time and resources from overall mission readiness to focus on compliance with inspection standards (Hyde, 2013).

A new inspection system was needed to shift the focus back to its fundamental purpose, which was to strengthen the command function, improve command effectiveness, promote military discipline, improve unit performance, and management excellence in units and staffs throughout the chain of command (Rogers, 2012). The very core of the change to the new inspection system was shifting responsibility for inspection from external functional leaders to wing commanders. Wing commanders are responsible for executing their missions; functional leaders are responsible for policy and oversight of their functional areas (Mueller, 2012). Functional inspections now fall under the wing commander's inspection programs, and major command Inspector Generals (MAJCOM IGs) validate and verify compliance (Mueller, 2012). In 2013, the Secretary of the Air Force directed the implementation of the new Air Force Inspection System; Air Force Policy Directive 90-2 as well as Air Force Instruction 90-201 (previously named Inspector General Activities) were revised accordingly.

The revised Air Force Inspection System consists of different tiers of inspection to include management inspection, Unit Effectiveness Inspection (UEI), commander's inspection program and unit self-assessment programs. Instead of relying solely on external inspections, the foundation of the new inspection system relies on internal self-assessments beginning at the unit level. Wing commanders have the flexibility to tailor their Commander's Inspection Program (CCIP), focusing resources in areas deemed most important to them. The wing Inspector General (IG) executes the CCIP and prioritizes those areas for inspections (SAF/IGI, 2016). Changes to the inspection process allow operational wings to focus on daily missions, make continuous improvement, while maintaining a stable state of readiness without increasing workload to facilitate large-scale external inspections.

The intent behind a continual new inspection process is to eliminate inspection preparation practice of painting the grass green since wing performance is now a photo album that captures a unit's performance over the inspection period versus a snapshot in time (Mueller, 2012). The inspection period or UEI cycle is every 24 to 36 months for each Regular Air

Force/Air Force Reserve Command Wing and 48 to 60 months for each Air National Guard Wing. The UEI is an external continual evaluation of Wing performance conducted by MAJCOM IG and/or the Air Force Inspection Agency teams based on four major graded areas: (a) executing the mission, (b) improving the unit, (c) managing resources, and (d) leading people. Instead of focusing solely on compliance, these four areas give leaders a more holistic view of true capability and inform them where to focus limited resources (Mueller, 2012).

The UEI incorporates elements of compliance and readiness to create a comprehensive assessment of unit effectiveness using a 4-tier rating system: highly effective, effective, marginally effective, and ineffective. An ineffective rating will require a reevaluation within 180 calendar days and can only receive a highest rating of effective instead of the original highest rating of highly effective (AFI 90-201, 2018).

In continuous preparation for a UEI, each wing has its own CCIP executed by its IG. The wing IG's annual inspection plan must include by-law programs and exercise requirements, which are mandatory CCIP inspection areas (AFI 90-201, 2018). Program inspections, also known as horizontal inspections, assess a program's health across a wing. If there is a pattern of multiple organizational units performing poorly in a program such as the unit fitness, then a nonmandatory horizontal inspection of all organizational units' fitness programs may be beneficial and appropriate. On the other hand, unit inspections or vertical inspections assess a specific organizational unit's health. Every organizational unit under the wing commander's purview is subject to at least one vertical inspection during the UEI cycle although this requirement can be waived at the wing commander level or T-3 (see Table 1).

A waiver is a commander's tool to "enhance mission effectiveness at all levels, while preserving resources and safeguarding health and welfare" (AFI 33-360, 2015). An approved waiver indicates the commander has accepted all the potential risks created by noncompliance (Stuart, 2019). According to AFI 33-360 (2015), there are three specific circumstances for a waiver:

1. The cost of compliance creates unacceptable risk to a higher priority task.

2. The expected cost of compliance outweighs the benefit.

3. Personnel cannot comply with the requirement due to a lack of resources.

To submit a waiver for a vertical inspection (Stuart, 2019):

1. Identify an opportunity to improve operations by simplifying or removing a requirement.

2. Identify the governing regulation and the applicable paragraphs for the appropriate waiver level.

Table 1. Waiver Levels

Tier Number	Waiver Authority
T-0	External to the Air Force (e.g. Congress, White House)
T-1	MAJCOM Commander who can delegate this authority no lower than the MAJCOM Director
T-2	MAJCOM Commander who can delegate this authority no lower than the first General Officer in the chain of command
T-3	Wing Commander who can delegate this authority no lower than the Squadron Commander or equivalent level

3. Determine who can approve the waiver (Table 1).

4. Route AF Form 679 and accompanying electronic Staff Summary Sheet for approval.

AF Form 679 specifies commander seeking waiver, waiver authority, governing publication, requirement requested to be waived, rationale for the waiver, the duration of the waiver, any applicable risk mitigation measure being taken and the impact of disapproval. However, even if a waiver is approved as "permanent," a commander can only approve a waiver for the length of his/her tour. The waiver expires 90 calendar days after the commander's change of command unless the new commander chooses to renew it. During the waiver period, the requesting commander/director is required to implement risk controls, work toward compliance (if applicable), continuously reevaluate risk and adjust accordingly.

Risk-Based Sampling Strategy

One risk mitigation measure that can be used to justify a vertical inspection waiver is using a risk-based sampling strategy (RBSS). A risk-based sampling strategy is defined as "a methodology employed to inspect areas deemed most important by commanders and functional area managers requiring an independent assessment by the Inspector General" (AFI 90-201, 2018). A wing's risk-based sampling strategy should focus on the wing commander's priorities and areas that are considered high risk. As stated in AFI 90-201 (2018), RBSS should include information sources that are objective performance indicators at the program and unit levels, which collectively provides a reliable assessment on a unit's effectiveness and efficiency. Although there is no formal guidance on what metrics to use or how to use them in an RBSS, some examples of these information sources from AFI 90-201 (2018) are:

- Air and Space Expeditionary Forces Unit Type Code Reporting Tools/Defense Readiness Reporting System
- Quality Assurance and Standardization/Evaluation programs
- Functional assessments, inspection results, after-action reports, and meeting minutes
- Individual Medical Readiness reports
- Individual Training Records
- Personal observations and Unit Self-Assessment Program results

- Climate surveys.

While AFI 90-201 (2018) states MAJCOM IG teams will build a tailored inspection risk-based sampling strategy for each Wing, it appears that the wings are expected to build their own risk-based sampling strategy.

23rd Wing

The 23rd Wing interprets RBSS as a sampling technique that looks at the two axes of "Likelihood of Happening" and "Impact to Mission" to prioritize which processes get inspected using a risk matrix or heat map. Beginning with the wing commander's intent and what areas are deemed to be the riskiest, the IG team and subject matter experts map different programs to the risk matrix.

23 Wing Top Risks 2021					
RISK	Minimal	Minor	Moderate	Significant	Severe
Mission Impact → Chance of Undetected Non Compliance ↓	No Mission Impact	Minor Mission Impact	Moderate Mission Impact	May Affect Ability to Accomplish Mission	Will Affect Ability to Accomplish Mission
Near Certainty					A-Staff Org/Lead WG (Draft)
Highly Likely			CBRN SII	Vertical – All Groups	Contested Phase I Contested C3
Likely			MCA Readiness Rpt	ATFP Recall / Accountability	Agile Phase II (Draft)
Low			By Laws	Active Shooter	Natural Disaster
Not Likely					

Figure 1. 23rd Wing Risk-Based Sampling Strategy

Figure 1 shows an example of how the risk matrix is used. The horizontal axis shows mission impact, while the vertical axis shows the chance of undetected noncompliance. Programs deemed most likely to occur with the highest consequences are plotted accordingly. For example, as shown in Figure 1, a natural disaster will affect the ability to accomplish the mission, but the chance of undetected noncompliance is low; therefore, it is color-coded yellow. Those in the red area of the risk matrix are riskiest and should be inspected first, followed by yellow and green. The risk matrix helps build the basis of the wing inspection plan in the Commander's Inspection Program, laying out the inspection schedule or inspection priority.

However, Air Combat Command (ACC) determined the 23rd Wing's RBSS is deficient as it is event-based and not risk-based (Figure 1). Due to the lack of a standardized risk-based sampling strategy across the MAJCOM, ACC sent the 23rd Wing an example of an acceptable RBSS used by the 129th Rescue Wing (RQW).

129th Rescue Wing

The 129th RQW's product (Figure 2) helps their Inspector General team prioritize which units and programs to inspect based on risk level. For vertical inspections conducted for specific units, the 129th RQW identifies 24 criteria for evaluation but use only 21 as shown in Table 2. The three criteria not used in the evaluation are identified with an asterisk. They are Readiness Reporting, Physical Training Test Passing Percentages, and Air Reserve Component Network Expeditionary Skills Rodeo Training Report Currency. Readiness reporting data is masked since the information is protected at a higher classification level. Physical training test passing percentage is eliminated due to it not being a priority for the commander. The Air Reserve Component Network Expeditionary Skills Rodeo Training Report Currency is not applicable for the period. The first nine criteria shown in Table 2 are recommended by AFI 90-201 (2018).

Table 2. 129th Rescue Wing Risk-Based Sampling Strategy Criteria

• Wing Commander Priority • Readiness Reporting • Quality and Assurance Standardization Evaluation Reports* • Photo Album Reports [functional assessments, Staff Assistance Visits, After Action Reports, meeting minutes, etc.] • Individual Medical Readiness • Individual Training Records • Airman/Inspections Directorate Personal Observations • Unit Self-Assessment Program (USAP) Findings [Weekly Action Report, Commander’s Inspection Management Board, USAP Tracker, Management Internal Control Toolset (MICT)] • Climate Surveys • Continuous Evaluation Results • Safety Reports • Quarterly Inspection Working Group, Guard Inspector General Council/Semi-Annual Inspection Council, Command Interest Items, Special Interest Items, Higher Headquarters Concerns for last year • Monthly End Strength	• Non-deployable monthly roster from Force Support Flight • Physical training test passing percentages* • Performance reports/Airman Comprehensive Assessment timelines • Air Reserve Component Network Expeditionary Skills Rodeo Training Report Currency* • Waivers • Time Since Last Inspection • Commander/Program Manager Off Station >4 months or Drill Status Guard • Critical and Significant Inspection Deficiencies from 106th Rescue Wing and 144th Fighter Wing for the last 2 years • MICT Compliance • Inspections Directorate MICT Metrics Assessment including quality of responses • Inspections Directorate Inspector General Evaluation Management System Metrics Assessment *Note: An asterisk (*) identifies criterion not assessed*

IGI Member:											
low number = inspect/higher vis high number = no inspect/lower vis Green = recommended by 90-201 Blue = complete		Gonkulator gonkulated on:	30-Dec-19								
Criteria		**Wing CC Priority** (weighted order of magnitude x 2)		QA Stan/Eval Reports	Photo Album Reports (Functional assessments, SAVs, AARS, meeting mins,	Amn/IGI Personal Obs	USAP Findings (WAR, CIMB, USAP Tracker, MICT)	Climate Surveys	Continual Eval Results		
Scaling Criteria		1=very high priority 2= 3= 4= 5= very low priority	(column C x 2)	1=unfavorable reports 2=no reports 3=neutral reports 4=favorable reports	1= very unfavorable reports 2=unfavorable reports 3=neutral/no reports 4=favorable reports 5=very favorable reports	1= very unfavorable obs 2=unfavorable obs 3=neutral obs 4=favorable obs 5=very favorable obs	1= very unfavorable obs 2=unfavorable obs 3=neutral/no obs 4=favorable obs 5=very favorable obs	1=improvement needed 2=caution 3=no survey 4=adequate 5=excellent	1=high risk 2=no CE 3=medium risk 4= 5=low risk		
Units										**SUM**	**RISK**
WS	[redacted]	3	6	2	3	1	2	3	1	59	Highest Risk
OG Staff (OGV)		2	4	3	3	4	4	4	2	64	Higher Risk
OSS		1	2	3	3	4	4	3	1	57	Highest Risk
129 RQS		3	6	3	3	4	4	4	2	76	Least Risk
130 RQS		1	2	3	3	1	2	3	2	66	Higher Risk
131 RQS		3	6	3	3	4	4	3	2	73	Less Risk
MXG Staff		2	4	3	4	3	3	5	2	63	Higher Risk
AMXS		3	6	3	3	4	3	4	2	72	Less Risk
MXS		3	6	3	3	3	3	4	2	65	Higher Risk
MOF		3	6	3	3	4	3	4	2	73	Less Risk
MSG Staff		4	8	2	3	4	4	4	2	78	Least Risk
LRS		3	6	3	3	4	5	4	3	75	Least Risk
SFS		1	2	4	4	3	4	4	3	69	Less Risk
CF		2	4	3	2	3	3	3	1	61	Highest Risk
CEF		3	6	3	3	3	3	4	1	68	Higher Risk
FSF		2	4	2	3	4	4	2	5	71	Less Risk
MDG		2	4	3	3	1	2	2	1	61	Highest Risk
CPTF		4	8	4	5	4	4	4	5	77	Least Risk

Mean=	68.2222
Std Dev=	6.52196

Highest Risk	61.7003	to	55.1783
Higher Risk	68.2222	to	61.7003
Mean =	68.2222		
Less Risk	74.7442	to	68.2222
Least Risk	81.2661	to	74.7442

Figure 2. 129th Rescue Wing Risk-Based Sampling Strategy (Truncated)

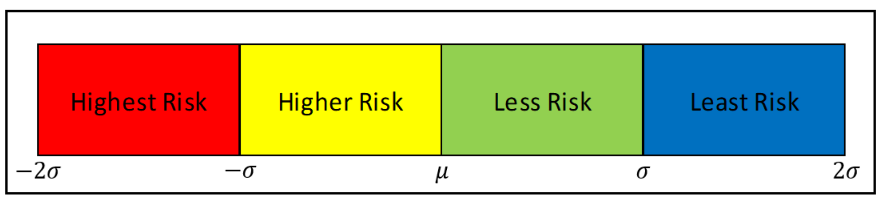


Figure 3. 129th Rescue Wing Risk-Based Sampling Strategy Risk Coding

Figure 2 shows a screenshot to illustrate the ACC-approved (129th RQW) RBSS tool whose sheer size would make it otherwise difficult to portray. See Appendix A for the full RBSS tool. For unit inspections, the wing commander priority is given twice the importance of all other criteria, but all other remaining criteria appear to be weighted equally. However, different criteria use a different scoring scale, such as 3, 4, 5, or 10 points without considerations for standardization. All the criteria are summed for each unit to give a total score where the lower the sum the higher the risk. Thus, higher point scale items bear more weight in the decision process. The mean and standard deviation are calculated separately for the different units. These means and standard deviations are then used to assess risk.

Units within one standard deviation of the mean are deemed higher risk (yellow) or less risk (green). Units two standard deviations of the mean are considered highest risk (red) or lowest risk (blue). Although not explicitly stated, this tool is likely using the Empirical Rule, which states that approximately 68% of scores will fall within 1 standard deviation of the mean, approximately 95% of scores will fall within 2 standard deviations of the mean, and approximately 99.7% of scores will fall within 3 standard deviations of the mean (McClave et al., 2018). The mathematical notation is $\bar{x} \pm ks$, where $\bar{x}$ is the sample mean, s is the sample standard deviation, and k is the number of standard deviations from the sample mean. The tool uses $k = 1$ for yellow or green and $k = 2$ for red or blue. Units are inspected based on risk level, where higher risk areas (red), which counterintuitively have the lowest total score, are first inspected. Figure 3 shows how the creator of the 129th RQW's RBSS tool determined the risk coding, likely based on the Empirical Rule (Figure 4).

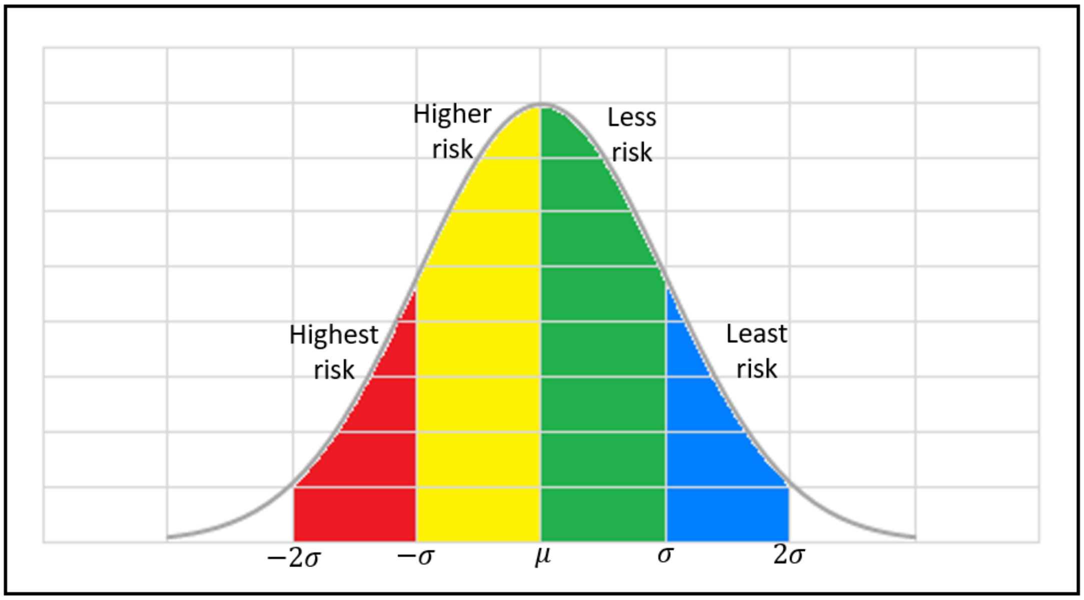


Figure 4. 129th Rescue Wing Risk-Based Sampling Strategy Risk Coding Under a Normal Curve

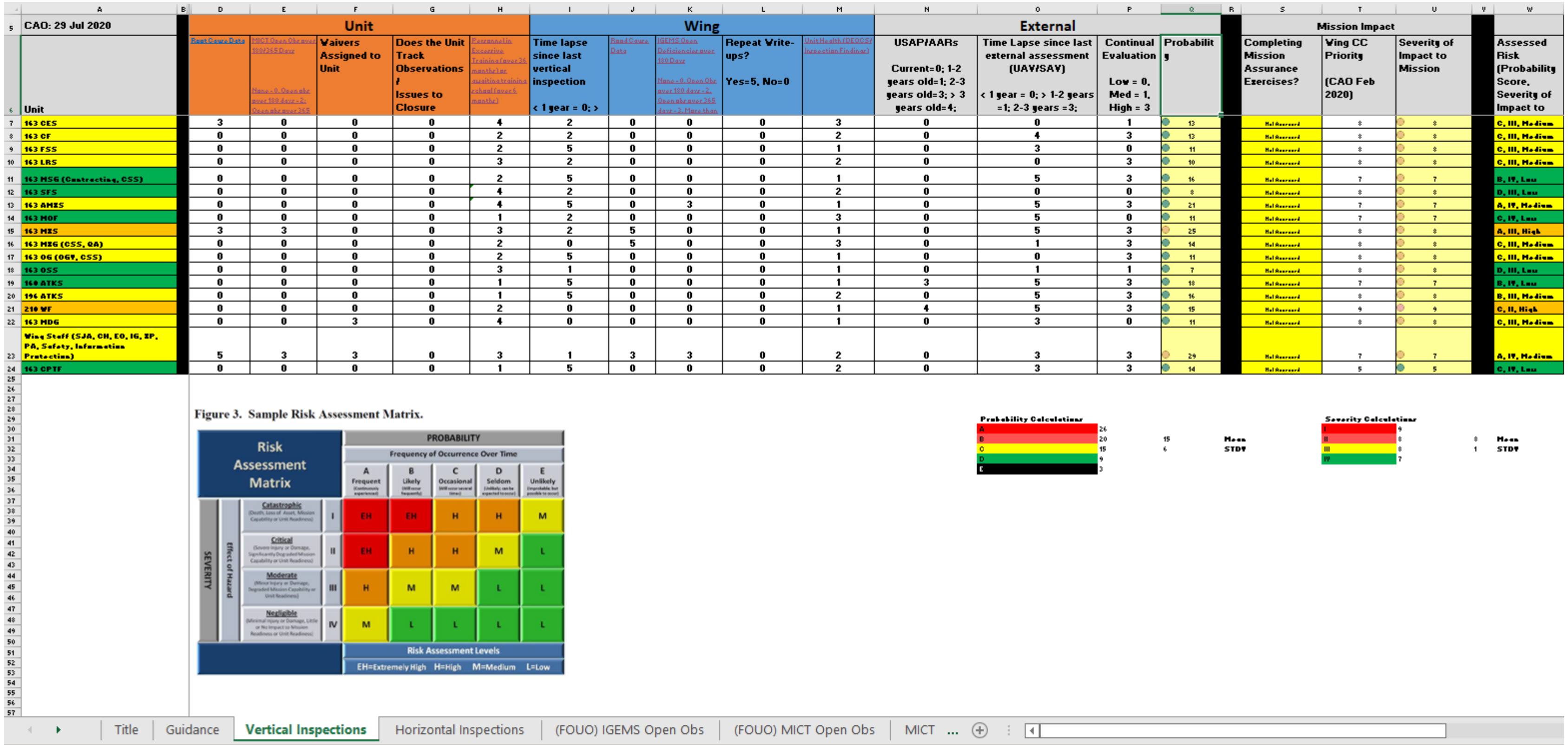
Upon further research, the 129th RQW was not the creator of their RBSS strategy. The 129th modified an RBSS that was obtained from the 163rd Attack Wing (ATKW) to meet their needs. As such, the overall framework of the 163rd ATKW's RBSS is very similar to its successor. However, there is an added layer of complexity as it incorporates a risk assessment matrix into the tool with input categories for both the probability and severity of the risks.

163rd Attack Wing

In the August 2020 version of the 163rd ATKW RBSS, 13 inputs, categorized by unit, wing and external, determined the probability of risk, and two inputs, one of which was not assessed, determined the severity of the impact to the mission during a vertical inspection. Table 3 showcases the different input criteria for vertical inspections.

Table 3. 163rd Attack Wing Risk-Based Sampling Strategy Criteria (2020)

Probability of occurrence	Severity of impact to mission
Unit • Unit Root Cause Data • Management Internal Control Toolset (MICT) Open Observations over 180/365 Days • Waivers Assigned to Unit • Does the Unit Track Observations/Issues to Closure Outside of MICT? • Personnel in Excessive Training (over 36 months) or awaiting training school (over 6 months) *Wing* • Time lapse since last vertical inspection • Wing Root Cause Data • Inspector General Evaluation Management System Open Deficiencies over 180 Days • Repeat Write-ups? • Unit Health (Defense Organizational Climate Survey/Inspection Findings) *External* • Unit Self-Assessment Program/After Action Reports • Time Lapse since last external assessment • Continual Evaluation	• Completing Mission Assurance Exercise* • Commander's Priority *Note: An asterisk (*) identifies criterion not assessed.*



Unit	Root Cause Data	MICT Open Obs over 180/365 Days (None - 0, Open obs over 180 days - 2; Open obs over 365 …)	Waivers Assigned to Unit	Does the Unit Track Observations / Issues to Closure	Personnel in Excessive Training (over 36 months) or awaiting training school (over 6 months)	Time lapse since last vertical inspection (< 1 year = 0; > …)	Root Cause Data	IGEMS Open Deficiencies over 180 Days (None - 0, Open Obs over 180 days - 2, Open obs over 365 days - 3, More than …)	Repeat Write-ups? (Yes=5, No=0)	Unit Health (DEOCS/Inspection Findings)	USAP/AARs (Current=0; 1-2 years old=1; 2-3 years old=3; > 3 years old=4;)	Time Lapse since last external assessment (UAV/SAV) (< 1 year = 0; > 1-2 years =1; 2-3 years =3;)	Continual Evaluation (Low = 0, Med = 1, High = 3)	Probability	Completing Mission Assurance Exercises?	Wing CC Priority (CAO Feb 2020)	Severity of Impact to Mission	Assessed Risk (Probability Score, Severity of Impact to …
CAO: 29 Jul 2020	Unit					Wing					External				Mission Impact			
163 CES	3	0	0	0	4	2	0	0	0	3	0	0	1	13	Not Assessed	8	8	C, III, Medium
163 CF	0	0	0	0	2	2	0	0	0	2	0	4	3	13	Not Assessed	8	8	C, III, Medium
163 FSS	0	0	0	0	2	5	0	0	0	1	0	3	0	11	Not Assessed	8	8	C, III, Medium
163 LRS	0	0	0	0	3	2	0	0	0	2	0	0	3	10	Not Assessed	8	8	C, III, Medium
163 MSG (Contracting, CSS)	0	0	0	0	2	5	0	0	0	1	0	5	3	16	Not Assessed	7	7	B, IV, Low
163 SFS	0	0	0	0	4	2	0	0	0	2	0	0	0	8	Not Assessed	8	8	D, III, Low
163 AMXS	0	0	0	0	4	5	0	3	0	1	0	5	3	21	Not Assessed	7	7	A, IV, Medium
163 MOF	0	0	0	0	1	2	0	0	0	3	0	5	0	11	Not Assessed	7	7	C, IV, Low
163 MXS	3	3	0	0	3	2	5	0	0	1	0	5	3	25	Not Assessed	8	8	A, III, High
163 MXG (CSS, QA)	0	0	0	0	2	0	5	0	0	3	0	1	3	14	Not Assessed	8	8	C, III, Medium
163 OG (OGV, CSS)	0	0	0	0	2	5	0	0	0	1	0	0	3	11	Not Assessed	8	8	C, III, Medium
163 OSS	0	0	0	0	3	1	0	0	0	1	0	1	1	7	Not Assessed	8	8	D, III, Low
160 ATKS	0	0	0	0	1	5	0	0	0	1	3	5	3	18	Not Assessed	7	7	B, IV, Low
196 ATKS	0	0	0	0	1	5	0	0	0	2	0	5	3	16	Not Assessed	8	8	B, III, Medium
210 WF	0	0	0	0	2	0	0	0	0	1	4	5	3	15	Not Assessed	9	9	C, II, High
163 MDG	0	0	3	0	4	0	0	0	0	1	0	3	0	11	Not Assessed	8	8	C, III, Medium
Wing Staff (SJA, CH, EO, IG, XP, PA, Safety, Information Protection)	5	3	3	0	3	1	3	3	0	2	0	3	3	29	Not Assessed	7	7	A, IV, Medium
163 CPTF	0	0	0	0	1	5	0	0	0	2	0	3	3	14	Not Assessed	5	5	C, IV, Low

Figure 3. Sample Risk Assessment Matrix.

Probability Calculations			
A	26		
B	20	15	Mean
C	15	6	STDV
D	9		
E	3		

Severity Calculations			
I	9		
II	8	8	Mean
III	8	1	STDV
IV	7		

Figure 5. 163rd Attack Wing Risk-Based Sampling Strategy (2020)

At first glance, the 163rd ATKW's RBSS (Figure 5) criteria all appear to be weighted equally and scores are summed when determining the probability of occurrence and severity of mission impact. However, different criteria use a different scoring scale with maximum values such as 3, 4, and 5 points without considerations for standardization. For example, time lapse since last vertical inspection has a maximum value of 5, while continual evaluation has a maximum value of 3. In essence, the 5 will carry more weight than the 3 when they both represent 100% of their respective criterion. All the criteria are summed for each unit to give a total score where the lower the sum the lower the risk. [Note: The 129th RQW modified the tool to reflect the opposite where the lower the sum of the criteria, the higher the risk. This is likely due to metrics used such as climate surveys already have an identified scale where the higher the value, the better the performance.]

The sample mean and standard deviation are calculated for probability and severity inputs. For probability inputs (Figure 6) using the scale A-E in descending order of likelihood from Figure 5, the mean value is set as the lower bound for occasional (or C) probability; values one standard deviation above the mean are deemed likely (or B); two standard deviations above the mean are frequent (or A); values one standard deviation below the mean are seldom (or D); and values two standard deviations below the mean are unlikely (or E). For severity inputs (Figure 7), there are only four possible outputs: catastrophic (I), critical (II), moderate (III), and negligible (IV). The mean is set as the lower bound for moderate severity (III). One standard deviation above the mean is considered critical (II) and two standard deviations above the mean is considered catastrophic (I). One or more standard deviations below the mean is considered negligible (IV). The outputs for both probability and severity are then mapped to the risk assessment matrix (Figure 8) to determine the level of risk ranging from extremely high to low, with the higher risk units inspected first. If the two units have the same risk level, then priority will be determined based on available resources such as subject matter experts to assist with the inspection.

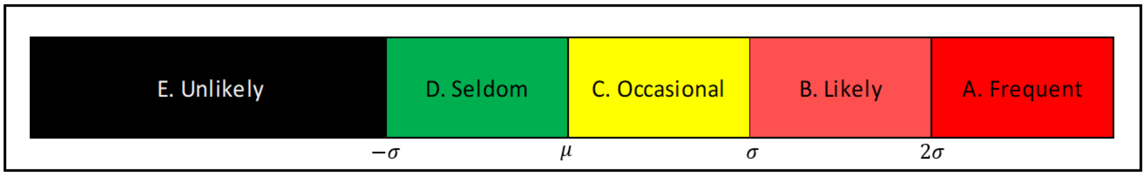


Figure 6. 163rd Attack Wing Risk-Based Sampling Strategy Probability Coding

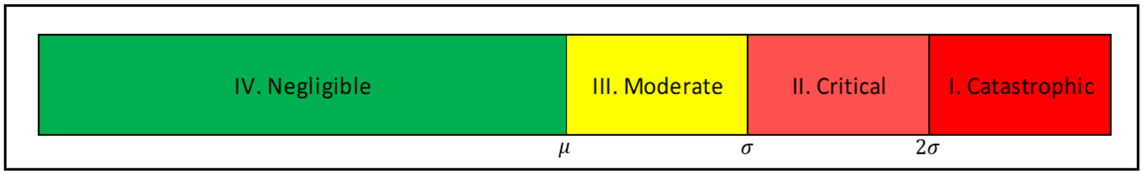
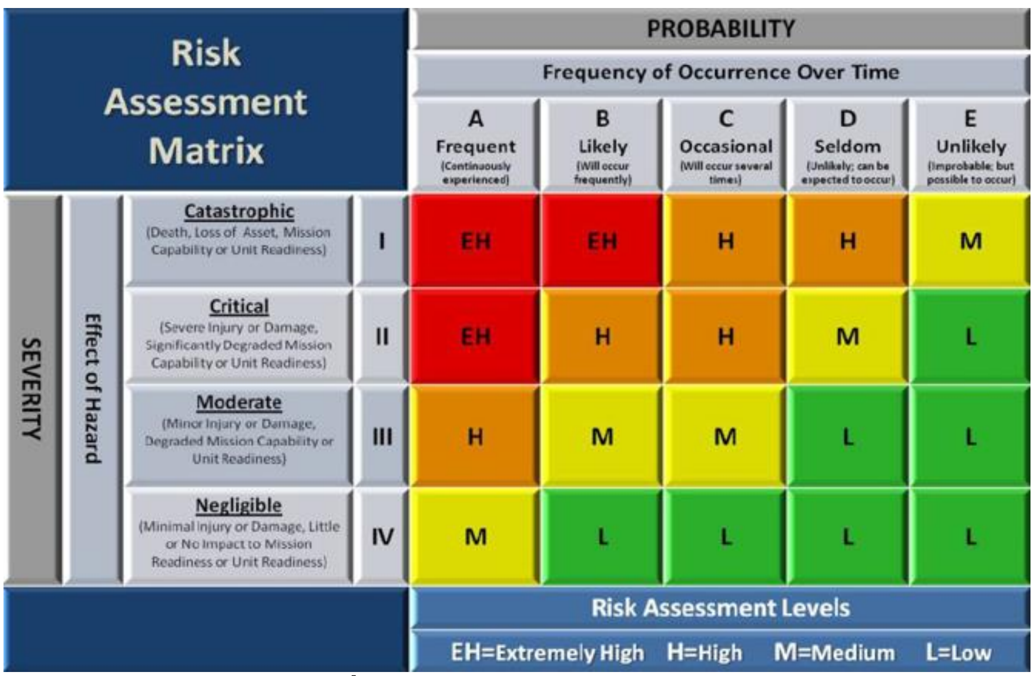


Figure 7. 163rd Attack Wing Risk-Based Sampling Strategy Severity Coding



Risk Assessment Matrix			PROBABILITY Frequency of Occurrence Over Time				
			A Frequent (Continuously experienced)	B Likely (Will occur frequently)	C Occasional (Will occur several times)	D Seldom (Unlikely; can be expected to occur)	E Unlikely (Improbable; but possible to occur)
SEVERITY	Effect of Hazard	Catastrophic (Death, Loss of Asset, Mission Capability or Unit Readiness) I	EH	EH	H	H	M
		Critical (Severe Injury or Damage, Significantly Degraded Mission Capability or Unit Readiness) II	EH	H	H	M	L
		Moderate (Minor Injury or Damage, Degraded Mission Capability or Unit Readiness) III	H	M	M	L	L
		Negligible (Minimal Injury or Damage, Little or No Impact to Mission Readiness or Unit Readiness) IV	M	L	L	L	L
			Risk Assessment Levels EH=Extremely High H=High M=Medium L=Low				

Figure 8. 163rd Attack Wing Risk Assessment Matrix

Unit	Time Lapse since last external inspection	External Agency Inspection Outcomes	# of External Agency findings "Critical"	# of External agency findings "Significant"	Any previous MGA assessed as ineffective?	Timelapse since last vertical inspection	Unit Self Assessment Thoroughness-Thorough answers/proof docs?	Timelapse since last independent WIT activity report?	MICT Observation Closure Rates More than 5 Obs over 365 days = 4	MICT Open Obs over 180/365 Days	IGEMS Open Deficiencies over 180 Days
SFS	5	0	0	0	0	0	5	7	3	4	0
AMXS	5	0	0	0	0	7	3	0	3	2	0
MOF	2	5	0	0	0	0	5	0	1	4	0
MXS	1	5	0	0	0	0	3	0	4	2	3
MXG Staff	1	5	0	0	0	0	2	0	1	0	3
OG Staff (OGV)	1	5	0	0	0	0	1	3	1	2	0
OSS	1	5	0	0	0	0	5	5	3	0	3
160 AS	1	0	0	0	0	7	5	7	1	0	0
196 AS	1	0	0	0	0	7	4	0	5	3	3
210 WF	1	0	0	0	0	7	2	7		0	3
MDG	1	0	0	0	0	7	5	7	5	3	0
HQ (SJA, CH, EO)	5	0	0	0	0	7	3	7	3	0	0
CPTF	2	5	0	0	0	7	1	0	5	2	0
MSA (MASO)	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed	4	7	Not Assessed	2	0
Safety	0	5	0	0	0	0	1	7	Not Assessed	0	3

Unit	IGEMS Deficiency Closure Rates (2014-Present)	Repeat Write ups?	Unit Health (DEOCS/Inspection Findings)	Probability	Completing Mission Assurance Exercises?	MICP/SOA Finding	CC Priority	Severity of Impact to Mission	Assessed Risk	Inspection Frequency in Months	Date of last Vertical Inspection	Date of last CC Deep Dive	Inspection Due
SFS	2	0	Not Assessed	26	Not Assessed	3	10	13	C, I, High	12-24	29-Jan-18		
AMXS	1	0	Not Assessed	21	Not Assessed	0	6	6	D, IV, Low	36-48	19-Mar-18		
MOF	3	0	Not Assessed	20	Not Assessed	0	7	7	D, III, Medium	24-36	19-Mar-18		
MXS	2	0	Not Assessed	20	Not Assessed	0	8	8	E, III, Low	36-48	19-Mar-18		
MXG Staff	4	0	Not Assessed	16	Not Assessed	0	7	7	E, III, Low	36-48	19-Mar-18		
OG Staff (OGV)	1	0	Not Assessed	14	Not Assessed	0	5	5	E, IV, Low	36-48			
OSS	2	0	Not Assessed	24	Not Assessed	0	8	8	C, III, Medium	24-36			
160 AS	1	0	Not Assessed	22	Not Assessed	0	7	7	C, III, Medium	24-36			
196 AS	1	0	Not Assessed	24	Not Assessed	0	7	7	C, III, Medium	24-36			
210 WF	1	0	Not Assessed	21	Not Assessed	0	9	9	D, II, Medium	24-36			
MDG	3	0	Not Assessed	31	Not Assessed	0	10	10	B, II, High	12-24	2-Feb-18		
HQ (SJA, CH, EO)	3	0	Not Assessed	28	Not Assessed	0	7	7	D, III, Low	36-48	4-Mar-18		
CPTF	1	0	Not Assessed	23	Not Assessed	0	6	6	D, IV, Low	36-48			
MSA (MASO)	0	0	Not Assessed	13	Not Assessed	0	5	5	E, IV, Low	36-48			
Safety	0	0	Not Assessed	16	Not Assessed	0	6	6	E, IV, Low	36-48	23-Feb-18		

CAO:
29-May-18

Figure 3. Sample Risk Assessment Matrix.

Risk Assessment Matrix		PROBABILITY — Frequency of Occurrence Over Time				
SEVERITY — Effect of Hazard		A Frequent (Continuously experienced)	B Likely (Will occur frequently)	C Occasional (Will occur several times)	D Seldom (Unlikely; can be expected to occur)	E Unlikely (Improbable; but possible to occur)
Catastrophic (Death, Loss of Asset, Mission Capability or Unit Readiness)	I	EH	EH	H	H	M
Critical (Severe Injury or Damage, Significantly Degraded Mission Capability or Unit Readiness)	II	EH	H	H	M	L
Moderate (Minor Injury or Damage, Degraded Mission Capability or Unit Readiness)	III	H	M	M	L	L
Negligible (Minimal Injury or Damage, Little or No Impact to Mission Readiness or Unit Readiness)	IV	M	L	L	L	L

Risk Assessment Levels
EH=Extremely High H=High M=Medium L=Low

Probability Calculations

A	37		
B	31	24	Mean
C	24	7	STDV
D	17		
E	11		

Severity Calculations

I	11		
II	9	7.5	Mean
III	7	1.8	STDV
IV	6		

CC Risk Tolerance;

EH	6-12 Months
H	12-24 Months
M	24-36 Months
L	36-48 Months

1. Column C—Time Lapse since last external inspection: < 1 year = 1; > 1-2 years =2; 2-3 years =3; greater than 3 years =5
2. Column D—Deficiencies noted during external inspections: If deficiencies were identified by external agencies, enter 5, if not enter 0
3. Column E - # of critical deficiencies found during external inspection: 0 = 0, 1 or more = 5
4. Column F - # of significant deficiencies found during external inspection: 0 = 0, 1-2 = 3, 3 or more = 5
5. Column G —Previous IG MGA rating of Ineffective: If any MGA was assessed as ineffective during an inspection, enter 10, if not enter 0
6. Column H - Time lapse since last vertical inspection: 0-6 mos = 0, 6-12 mos = 1, 12 - 24 mos = 3, 24-36 mos= 5, 36 or more mos = 7
7. Column I—Unit self-Inspection thoroughness in MICT (Assessed by Wing IG): Outstanding = 1; Excellent = 2; Effective = 3; Ineffective = 5
8. Column J - WIT independently validating unit self-assessment (# of months since last WIT report): 1-3 = 0, 3-6=3, 6-9= 5, 9 or more months = 7
9. Column K—MICT observation closure rates (average days): < 75 = 1; 76-100 = 2; 101-150 = 3; 151-200 = 4; >200 = 5
10. Column L—MICT Open Obs over 180 Days: None = 0, Open obs over 180 days = 2; Open obs over 365 days = 3; More than 5 Obs over 365 days = 4
11. Column M—IGEMS Open Deficiencies over 180 days: If open deficiencies over 180 days enter 3, if none enter 0
12. Column N—IGEMS Deficiency Closure Rates: < 100 Days = 1; 100-150 = 2; 151-200 = 3; >200 = 4
13. Column K—Repeat Write-ups: If the unit has had repeat write-ups, enter 5, if not enter 0
14. Column L—DEOCS: If there are negative indicators for morale, equal opportunity, sexual harassment, or unsafe work environment, enter 5, if not enter 0
15. Column S - % of Mission Assurance Exercises unit participated in: 100% = 0, 99-80%= 3, 79-70% = 5, 70% or less = 7
16. Column T - MICP/SOA Finding = 0, 50% or more of unit operations conducted within the city, but not on main installation = 3, all operations conducted off main installation/out of city limits = 5

Figure 9. 163rd Attack Wing Risk-Based Sampling Strategy (2018)

The June 2018 version of the 163rd ATKW RBSS (Figure 9) is the version the 129th RQW used as the foundation of their RBSS. The primary difference between the June 2018 version and the July 2020 versions are the number of criteria, the criteria selected for evaluation and the categorization of probability inputs (unit, wing, and external) for the latter. The overall framework for calculating risk did not change between the two products.

Table 4. 163rd Attack Wing Risk Based Sampling Strategy Criteria (2018)

Probability of occurrence	Severity of impact to mission
• Time lapse since last external inspection • External agency inspection outcomes • Number of external agency findings "critical" • Number of external agency findings "significant" • Any previous major graded areas assessed as ineffective • Time lapse since last inspection • Unit self-assessment thoroughness • Time lapse since last Wing Inspection Team activity report • Management Internal Control Toolset (MICT) observation closure rates • MICT open observations over 180/365 days • Inspector General Evaluation Management System (IGEMS) open deficiencies over 180 days • IGEMS deficiency closure rates • Repeat write ups • Unit Health*	• Completing Mission Assurance Exercise* • Manager's Internal Control Program/Statement of Assurance Findings • Commander's Priority *Note: An asterisk (*) identifies criterion not assessed.*

The June 2018 version used 14 inputs, one of which was not assessed, were considered to determine the probability of a risk to a unit and three inputs, one of which was not assessed, were considered to determine the severity of the impact to the mission during a vertical inspection. Table 4 lists the different input criteria for vertical inspections.

As we continue to trace the roots of the RBSS strategy, we determined that the 163rd ATKW also modified an RBSS provided to them by ACC IG in 2017. Neither the MAJCOM IG who gave the 163rd ATKW the example nor the person identified as the originator of the Excel file are in the Air Force email global directory service. For further insight, we reached out to ACC IG and was told the spreadsheet may have originated from the 366th Fighter Wing (FW). Due to personnel turnover, we were unable to contact the originator of the spreadsheet but connected with the current 366th FW RBSS subject matter expert (SME). However, the current draft of the 366th FW RBSS tool (Figure 10) does not appear to be the parent tool of the 163rd ATKW tool as it does not resemble what the 163rd ATKW claims to be the unmodified example originally received from ACC. However, due to personnel turnover again and potential product improvements over time, we cannot say with 100% certainty that the roots of the 129th RQW RBSS tool did not originate from the 366th FW. As we were unable to contact the creator of the RBSS, our analysis is limited to our interpretations of the spreadsheet and information from the current SME.

366th Fighter Wing

The 366th FW provided a draft of their current RBSS (Figure 10), which they are in the process of modifying and understanding. It includes objective and subjective metrics and complicated formulas that are difficult to follow to determine a total unit/risk score. The objective metrics include last inspection date (which is turned into a multiplier), the percentage of self-assessment programs completed, the observation/deficiencies ratio (the number of Management Internal Control Toolset or MICT observations in the last 12 months over the number of Inspector General Evaluation Management System or IGEMS deficiencies in the last

24 months), the number of IGEMS deficiency points, and the number of MICT deficiency points.

The subjective assessment component allows subject matter experts (SMEs) and leadership to express their concerns about a unit using a scale of 0-3 where 3 represents very concerned. The panel of subjective assessors include the wing commander, IG, IG director of inspections, IG superintendent, inspection planner, assistant inspection planner, leader exercise, assistant exercise, wing self-assessment program manager, and Wing Inspection Team Manager. Each SME opinion is equally weighted except for the fighter wing commander's assessment which has a weight of 3, the IG's assessment which has a weight of 2.25 and the IG director of inspections which has a weight of 1.75. The weighted average of SME opinions become one subjective value, which then translates into subjective inspection priority score. This subjective assessment value, time since last inspection multiplier, and observations and deficiencies metrics are used to determine the total unit/program risk score using an unintuitive complicated formula that a new RBSS officer would have difficult deciphering. Figure 11 shows the risk score formula and relevant columns used in the formula.

While we cannot determine whether the 366th FW draft RBSS precedes the 163rd ATKW and the 129th RQW's, it further indicates the need to have a standardized RBSS process that is easily to use, comprehend and turnover to somebody else, so that resources are not wasted to decipher a complicated product or to reinvent the wheel every time there is a turnover.

Organization	Total Unit/Program Risk Score	Last Inspection Date	Mulitplier	SAP Completed Rubric Score	% SAP Completed (last 12 months) = # compl/total SACs	Observation/Deficiencies Ratio	Subjective Assessment	# of IGEMS Deficiencies (Internal + External) (Last 24 Months)	IGEMS Deficiency Points Critical 5 pts ea Significant 3 pts ea (Last 24 months)	# of MIC-T Observations (last 12 months)	MICT Deficiency Points Critical 5 pts ea Significant 3 pts ea (Last 12 months)	GSU Step Yes = 1 No = 0	AF/MAJCOM SII/CII (Interest item = 5)
391 FS	72	9-Jul-20	4	0	100%	4	0	18	5	4	0	0	
391 FGS	10	25-Jan-22	1	0	100%	0	0	0	0	6	0	0	
390 ECS	15	24-Sep-21	1	0	100%	5	0	9	3	0	0	0	
389 FS	42	25-Jun-21	2	0	100%	3	0	22	16	11	0	0	
389 FGS	#REF!		4	0	100%	0	0	0	0	0	0	0	
428 FS	#REF!	10-Jan-20	4	0	93%	3	0	18	6	5	0	0	
366 MXS	#REF!	11-Jun-21	2	0	100%	3	0	34	15	9	5	0	
366 MUNS	#REF!	9-Oct-20	3	0	96%	4	0	24	6	4	0	0	
366 CES	#REF!	4-Sep-20	4	0	100%	3	0	32	9	16	9	0	
366 CS	#REF!	20-Nov-20	3	0	99%	2	0	22	20	44	9	0	
366 FSS	#REF!	30-Apr-21	2	0	100%	2	0	29	15	44	9	0	
366 FAS	#REF!	28-Feb-20	4	0	98%	2	0	15	18	16	3	0	
366 LRS	#REF!	12-Feb-21	3	0	100%	2	0	29	18	32	6	0	
366 OSS	#REF!	18-Sep-20	3	0	100%	3	0	32	12	22	18	0	
366 SFS	#REF!	7-Aug-20	4	0	100%	3	0	26	3	12	3	0	
366 OMRS	#REF!	24-Jul-20	4	0	100%	2	0	17	3	35	3	0	
366 HCOS	#REF!	2-Apr-21	2	0	100%	2	0	10	3	17	0	0	

Organization	Total Unit/Program Risk Score	Last Inspection Date	IGI Subjective Assessment				Grading Rubric: 0 = Not Concerned, 1 = Slighty Concerned, 2 = Concerned, 3 = Very Concerned								
			FW/CC	IG	IGI, Director	IGI, Super	Inspection Planner	Asst Inspection planner	Lead Exercise	Asst Exercise	FW SAPM	WIT Manager	Weighted Average	FW Priority	ABS Value of FW priority
391 FS	72	9-Jul-20	0	0	0	0	0	0	0	0	2	0	1	8	10
391 FGS	10	25-Jan-22	0	0	0	0	0	0	0	0	2	0	1	8	10
390 ECS	15	24-Sep-21	0	0	0	0	0	0	0	0	1	0	1	8	10
389 FS	42	25-Jun-21	0	0	0	0	0	0	0	0	2	0	1	8	10
389 FGS	#REF!		0	0	0	0	0	0	0	0	2	0	1	8	10
428 FS	#REF!	10-Jan-20	0	0	0	0	0	0	0	0	1	0	1	8	10
366 MXS	#REF!	11-Jun-21	0	0	0	0	0	0	0	0	2	0	1	8	10
366 MUNS	#REF!	9-Oct-20	0	0	0	0	0	0	0	0	1	0	1	8	10
366 CES	#REF!	4-Sep-20	0	0	0	0	0	0	0	0	2	0	1	8	10
366 CS	#REF!	20-Nov-20	0	0	0	0	0	0	0	0	3	0	1	8	10
366 FSS	#REF!	30-Apr-21	0	0	0	0	0	0	0	0	3	0	1	8	10
366 FAS	#REF!	28-Feb-20	0	0	0	0	0	0	0	0	2	0	1	8	10
366 LRS	#REF!	12-Feb-21	0	0	0	0	0	0	0	0	2	0	1	8	10
366 OSS	#REF!	18-Sep-20	0	0	0	0	0	0	0	0	2	0	1	8	10
366 SFS	#REF!	7-Aug-20	0	0	0	0	0	0	0	0	1	0	1	8	10
366 OMRS	#REF!	24-Jul-20	0	0	0	0	0	0	0	0	1	0	1	8	10
366 HCOS	#REF!	2-Apr-21	0	0	0	0	0	0	0	0	1	0	1	8	10

Figure 10. 366th Fighter Wing Risk-Based Sampling Strategy (draft)

C3 | =ROUNDUP(((AC3+N3+O3)*E3)+(I3*(E3/1.25))+((H3+K3+K3)*(E3/1.75)),0)

	B	C	E	H	I	K	N	O	AC
1–2	Organization	Total Unit/Program Risk Score	Mulitplier	Observation/Deficiencies Ratio	Subjective Assessment	IGEMS Deficiency Points Critical 5 pts ea Significant 3 pts ea (Last 24 months)	GSU Step Yes = 1 No = 0	AF/MAJCOM SII/CII (Interest item = 5)	ABS Value of FW priority
3	391 FS	72	4	4	0	5	0		10
4	391 FGS	10	1	0	0	0	0		10
5	390 ECS	15	1	5	0	3	0		10
6	389 FS	42	2	3	0	16	0		10
7	389 FGS	#REF!	4	0	0	0	0		10
8	428 FS	#REF!	4	3	0	6	0		10
9	366 MXS	#REF!	2	3	0	15	0		10
10	366 MUNS	#REF!	3	4	0	6	0		10
11	366 CES	#REF!	4	3	0	9	0		10
12	366 CS	#REF!	3	2	0	20	0		10
13	366 FSS	#REF!	2	2	0	15	0		10
14	366 FAS	#REF!	4	2	0	18	0		10
15	366 LRS	#REF!	3	2	0	18	0		10
16	366 OSS	#REF!	3	3	0	12	0		10
17	366 SFS	#REF!	4	3	0	3	0		10
18	366 OMRS	#REF!	4	2	0	3	0		10
19	366 HCOS	#REF!	2	2	0	3	0		10

Figure 11. 366th Fighter Wing Risk Score Formula

Lieutenant General Stephen P. Mueller (2014), prior Air Force Inspector General, once described the new Air Force inspection system (AFIS) as the Air Force's "single largest cultural change in the past four decades," yet the Office of the Secretary of the Air Force, Inspector General, Inspections Directorate (SAF/IGI) directed the "implement first, innovate later" strategy (2013, as cited in Craft, 2016). As such, the rushed nature of the implementation of AFIS resulted in open interpretation of how to create a risk-based sampling strategy.

While we consider decision analysis tools such as the multi-objective decision-making process and analytic hierarchy process in our research (Saaty, 1994; Kirkwood, 1995; Eschenbach 2011), it is highly unlikely wings will adopt an unfamiliar and more complex approach. Therefore, we focus our research on modifying and improving an existing ACC-approved tool that has been used as an example forming the foundation of many wing's RBSS.

The general structure of the 129th RQW and 163rd ATKW RBSSs loosely resemble Likert scale processes. To avoid bias, Likert items generally have a balance of both positive and negative responses on a symmetric scale where each successive response option is considered better, although the opposite is true for a reverse Likert scale (Willits et al., 2016). To achieve balance, different response choices for a Likert item should be equidistance apart. If all Likert items use the same scale, then their responses may be summed together to create a score for each respondent (Johns, 2010; Willits et al., 2016). Although both the 129th and 163rd RBSSs do not follow the general guidelines for the Likert scale process, the wings do sum different-scaled unbalanced Likert responses to get a total score for each organizational unit.

Based on the existing tools we examined, there is no standard weighting system resulting in potential skewed results and possibly inaccurate decisions. The extensive number of inputs that need to be manually entered into the tool is time consuming and cumbersome, which may discourage true implementation to inform decisions. To prevent RBSS from becoming an extension of the previous bad habit of painting the grass green to pass inspection, there needs to be a comprehensive standardized process. In addition, due to personnel turnover, an RBSS that previously passed inspection or sent out as an example may become the gold standard without anybody questioning whether the framework is statistically sound.

Summary

Overall, we were unable to find published literature to substantiate the process implemented by the various discussed units. Furthermore, we were unable to locate sources on how to combine independent criteria scores using different scales while mixing Likert scale variables with dichotomous variables, which we further discuss in Chapter 3. In this chapter, we discussed the relevant history of the Air Force inspection system and the purpose of a risk-based sampling strategy. We reviewed RBSS tools currently used by the 23rd Wing, 129th RQW, 163rd ATKW, and 366th FW. In Chapter 3, we hone in on the haphazard nature of the current processes, focusing on the tools of the 129th RQW and 163rd ATKW.

III. Methodology

Chapter Overview

The purpose of this chapter is to examine the data in the 129th Rescue Wing (RQW) and 163rd Attack Wing's (ATKW) risk-based sampling strategies (RBSSs) focusing on their process for vertical inspections. We begin by describing the current tool and explaining its different components. We then discuss what analysis techniques we use to assess the statistical properties of the current tool. Part of this assessment entails investigating the dichotomous variables used in the two RBSSs. We describe the process of calculating the percent contribution to the response variable and changing the values selected to represent the dichotomous variable to see how it impacts the tool. The descriptive evaluation of the presented data determines what values to use in our simulation as we attempt to reproduce those Likert scale patterns using a binomial distribution. We explain our data simulation process and how it affects the standardized score and how metrics are calculated.

Risk-Based Sampling Strategy Instruments and Components

The 129th RQW and 163rd ATKW RBSS instruments are structurally similar. To better understand how the instruments work, we break them down into their components. The tools consider the following data: number of organizational units, number of criteria, and defined scales for each criterion. The instrument first identifies evaluation criteria for determining unit risk. Each criterion has its respective defined scale, which ranges from 2 to 5 points. The evaluation criteria are then scored and summed for each unit. The aggregate score for all units is then converted into a standardization metric where its sample mean and sample standard deviation are used to categorize units into different risk groups and to determine their inspection priority from highest to lowest risk.

Assumptions and Limitations

Our analysis is limited by the following assumptions: (1) All criteria each wing selects for evaluation are independent of one another so there is no duplication of effort. (2) Organizational units required to be inspected are separate entities and independent of one another. (3) The user wants each criterion to contribute equally to the sum, which is the response of interest. (4) The user wants to keep the instrument simple and does not want to perform complicated calculations or scalings. (5) The user prefers an Excel spreadsheet format. (6) All independent criteria are modeled as binomial random variables with the same probability of success, which allow us to investigate the overall data dominance patterns and not have contradictory responses that cancel each other out and conceals the pattern. (7) We only consider half of the bivariate model, the portion of the data labeled as probability of occurrence, in the 163rd ATKW RBSS (Table 3) in our analysis since those are the values summed to help inform the decision and the portion used as the framework for the 129th RQW RBSS. (8) For simplicity, our analysis will assume all criteria use the same Likert scale. By using one Likert scale, patterns become more apparent. (9) The process for the nonmandatory horizontal inspections focusing on programs instead of units use the same overall framework and process as vertical inspections for determining inspection priority but fewer evaluation criteria. As such, we focus on the process used for mandatory vertical inspections.

Instruments Used for Analysis

For our analysis, we use two different software tools: Excel spreadsheet and JMP Pro 15 software. Excel spreadsheet is the chosen tool for current RBSSs as it is intuitive and straightforward to use. JMP Pro 15 software allows easy data simulation. We use JMP Pro 15 to generate random data changing the values for the number of units, number of criteria and type of scale used to examine how the response is impacted. The simulation process reveals the theoretical responses while varying inputs. Descriptive statistical data from both the 129th RQW and 163rd ATKW help define the range of values used for simulation.

Determining Values for Simulation

Four input variable values are used in data simulation: the number of organizational units, the number of criteria, the type of Likert scale used, and the percentage of successful trials. We will discuss the last input variable in the section regarding the binomial distribution. The range of values selected for each input variable are based on actual data observed in the 129th RQW and 163rd ATKW RBSSs. These input ranges are used in JMP Pro 15 to simulate different scenarios and to determine the theoretical distribution for our response variable, which is the sum of a unit's score.

Number of Units

Both the 129th RQW and 163rd ATKW coincidentally have the same number of units to inspect, 18. To include a third data point, we also consider the number of units the 366th FW is required to inspect, which is 17, as we have that information available. For our simulation, we select a range of 10 to 20 units and keep the increments evenly spaced (five). We use 10 units as the minimum value to account for smaller organizations.

Number of Criteria

To determine the number of criteria to use in our analysis, we examine the data of both 129th RQW and 163rd ATKW. The 129th RQW's risk-based sampling strategy considered 24 criteria as listed in Table 2 with higher scores equaling to lower risk; however, three were not assessed so only 21 were used. The 163rd Attack Wing's risk-based sampling strategy (2020) used 13 criteria as listed in Table 3 for the probability of occurrence with lower scores equaling lower risk. Since those are the values summed to help inform the decision and the portion used as the framework for the 129th Rescue Wing's RBSS, we only consider them in our analysis. Of the 13 criteria, two do not make any meaningful contribution as all units scored perfectly on them.

The data shows a range of 13 to 21 for the number of criteria. We use a range of five to 25 in increments of five to cover the full range. The lower bound of five criteria is used instead of 10 to explore the patterns of a simpler RBSS model.

Type of Scale Used

To determine what Likert scale to use, we examine what scales were used by the two units. Both the 129th RQW and the 163rd ATKW combined different scales when calculating the response variable. These different scales range from a 2-point Likert scale or dichotomous scale to a 5-point Likert scale. An in-depth look at the data reveals differences between the theoretical or defined scale and the actual scale used. Intuitively, the highest score should reflect the Likert scale used; however, that is not the case as defined scores are not equidistance apart. For example, in the 163rd ATKW RBSS, a criterion may have possible values of 0, 1, 3, and 5 in the defined scale where some values are one unit apart whereas others are two units apart. To determine the true Likert scale of each criterion, we count the number of defined values in the scale or groups. For both highest scores and defined groups, there were discrepancies between the theoretic metrics and their actual counterparts.

For the 129th Rescue Wing, 87.5% (21) of the 24 criteria were used in the evaluation. Three criteria (individual training records, monthly end strength, and MICT compliance) did not specify or did not fully specify its scale. Since the highest value used in the evaluation was a 5, we assumed that those criteria used a high score of 5. Observed assessment values used for those three criteria were divided into three groups, so we assume the theoretical scale is based on a 3-

point Likert scale matching the actual metrics. Table 5 features the 129th RQW RBSS Metrics revealing the discrepancy between possible scores and scores actually used.

Table 5. 129th Rescue Wing Risk-Based Sampling Strategy Metrics

Criteria	Scores possible	Scores used	Highest score possible	Highest score used	Groups possible	Groups used
Wing Commander Priority	2,4,6,8,10	2,4,6,8	10	8	5	4
Quality and Assurance Standardization Evaluation Reports	1,2,3,4	2,3,4	4	4	4	3
Photo Album Reports	1,2,3,4,5	2,3,4,5	5	5	5	4
Individual Medical Readiness	1,2,3	2,3	3	3	3	2
Individual Training Records	Unknown	3,4,5	5	5	Unknown (assume 3)	3
Airman/Inspections Directorate Personal Observations	1,2,3,4,5	1,3,4	5	4	5	3
Unit Self-Assessment Program Findings	1,2,3,4,5	2,3,4,5	5	5	5	4
Climate Surveys	1,2,3,4,5	2,3,4,5	5	5	5	4
Continuous Evaluation Results	1,2,3,5	1,2,3,5	5	5	4	4
Safety Reports	1,2,3,4,5	2,3,4	5	4	5	3
Quarterly Inspection Working Group, Guard Inspector General Council/Semi-Annual Inspection Council, Command Interest Items, Special Interest Items, Higher Headquarters concerns for last year	1,2,3	1,2,3	3	3	3	3
Monthly End Strength	Unknown	2,3,5	5	5	Unknown (assume 3)	3
Non-deployable monthly roster	1,2,3,4,5	2,5	5	5	5	2
Performance reports/Airman Comprehensive Assessment timelines	1,2,3,4,5	2,4	5	4	5	2
Waivers	1,3	1,3	3	3	2	2
Time Since Last Inspection	1,2,3,4	1,2,3,4	4	4	4	4
Commander/Program Manager Off Station	1,5	1,5	5	5	2	2
Critical and Significant Inspection Deficiencies from	1,2,3	1,2,3	3	3	3	3
MICT Compliance	4,5 defined	3,4,5	5	5	Unknown (assume 3)	3
IGI MICT Metrics Assessment	1,2,3,4,5	1,2,3,4,5	5	5	5	5
Inspections Directorate Inspector General Evaluation Management System Metrics Assessment	1,2,3,4,5	1,2,3,4,5	5	5	5	5

Table 6 shows the highest score possible and highest score used as well as the discrepancy between the two. Of the 21 criteria, one (4.76%) had the highest possible value of 10, 14 (66.67%) had the highest value of 5, two (9.52%) had the highest value of 4 and four (19.05%) had the highest value of 3. The possible scores and the scores used are not necessarily the same. Of the 21 criteria, one (4.76%) used a highest score of 8, eleven (52.38%) used a highest score of 5, five (23.81%) used a highest score of 4, and four (19.05%) used a highest score of 3. In other words, one-third of the criteria (seven) did not have any units achieve the theoretical high score. The asterisk by the score of 8 in Table 6 denotes it is the same criterion with a possible score of 10. The total discrepancy only counted that criterion once.

Table 6. 129th Rescue Wing Risk-Based Sampling Strategy Scaling Criteria Highest Score

Score	Possible (#)	Possible (%)	Used (#)	Used (%)	Discrepancy
3	4	19.05%	4	19.05%	0.00%
4	2	9.52%	5	23.81%	14.29%
5	14	66.67%	11	52.38%	14.29%
8*	0	0.00%	1	4.76%	4.76%
10	1	4.76%	0	0.00%	4.76%
Total	21	100.00%	21	100.00%	33.33%

Note: The asterisk (*) denotes the score of 8 is the same criterion as the one with a possible score of 10. Its contribution to the total discrepancy is not double counted.

Table 7. 129th Rescue Wing Risk-Based Sampling Strategy Scaling Criteria Groups

x-Point Scale	Possible (#)	Possible (%)	Used (#)	Used (%)	Discrepancy
2	2	9.52%	5	23.81%	14.29%
3	6	28.57%	8	38.10%	9.52%
4	3	14.29%	6	28.57%	14.29%
5	10	47.62%	2	9.52%	38.10%
Total	21	100.00%	21	100.00%	76.19%

The highest theoretical score does not translate into the theoretical Likert scale used as the possible values defined are not contiguous. As shown in Table 7, the data reveals that the theoretical values for the scale were clustered into two to five groups. Ten (47.62%) criteria use a 5-point Likert scale, three (14.29%) use a 4-point Likert scale, six (28.57%) use a 3-point Likert scale and two (9.52%) use a dichotomous scale. The actual assessment values reveal two (9.52%) criteria use a 5-point Likert scale, six (28.57%) use a 4-point Likert scale, eight (38.10%) use a 3-point Likert scale and five (23.81%) use a 2-point Likert or dichotomous scale. The actual metrics show a 76.19% discrepancy between the theoretical scale and the actual scale. Most significant are three criteria that were defined with a Likert-scale result in assessed values that are dichotomous, inadvertently increasing dichotomous criteria from two to five.

For the 163rd Attack Wing, 13 criteria with differing scales were used to calculate the response variable. Two criteria (waivers assigned to units and unit health) did not specify its scale. Since the highest value used in the evaluation of both criteria was a 3, we assumed that 3 is the theoretical high. Observed assessment values used for waivers were divided into two groups, so we assume the theoretical scale is based on a dichotomous scale matching the actual metrics. Observed assessment values used for unit health were divided into three groups, so we assume the theoretical scale is based on a 3-point Likert scale matching the actual metrics. Table 8 features the 163rd ATKW RBSS Metrics revealing the discrepancy between scores possible and scores used.

Table 8. 163rd Attack Wing Risk-Based Sampling Strategy Metrics

Criteria	Scores possible	Scores used	Highest score possible	Highest score used	Groups possible	Groups used
Unit Root Cause Data	1,2,3,4,5	0*,3,5	5	5	5	3
Management Internal Control Toolset Open Observations over 180/365 Days	0,2,3,4	0,3	4	3	4	2
Waivers Assigned to Unit	Unknown	0,3	Unknown (assume 3)	3	Unknown (assume 2)	2
Does the Unit Track Observations/Issues to Closure Outside of MICT?	0,5	0	5	0	2	1
Personnel in Excessive Training (over 36 months) or awaiting training school (over 6 months)	1,2,3,4,5	1,2,3,4	5	4	5	4
Time lapse since last vertical inspection	0,1,3,5	0,1,2*,5	5	5	4	4
Wing Root Cause Data	1,2,3,4,5	0*,3,5	5	5	5	3
Inspector General Evaluation Management System Open Deficiencies over 180 Days	0,2,3,4	0,3	4	3	4	2
Repeat Writeups	0,5	0	5	0	2	1
Unit Health	Unknown	1,2,3	Unknown (assume 3)	3	Unknown (assume 3)	3
Unit Self-Assessment Program/After Action Reports	0,1,3,4,5	0,3,4	5	4	5	3
Time Lapse since last external assessment	0,1,3,4,5	0,1,3,4,5	5	5	5	5
Continual Evaluation	0,1,3	0,1,3	3	3	3	3

Note: An asterisk (*) indicates the score used was not defined in the scale.

There were three criteria (MICT Root Cause Data, Time Lapse Since Last Vertical Inspection, and IGEMS Root Cause Data) where the scale used fell outside of the scale defined as indicated by the asterisk in Table 8. Both MICT Root Cause Data and IGEMS Root Cause Data had scores of 0 in the evaluation when the defined scale was 1-5. Time Lapse Since Last Vertical Inspection consistently used a value of 2 instead of the defined value of 3.

Table 9 shows the highest score possible and highest score used as well as the discrepancy between the two for the 163rd ATKW. Of the 13 criteria, eight (61.54%) had the highest possible value of 5, two (15.38%) had the highest value of 4 and three (23.08%) had the highest value of 3. Like the 129th RQW's RBSS, the possible scores and the scores used are not necessarily the same. Of the 13 criteria, four (30.77%) used a highest score of 5, two (15.38%) used a highest score of 4, five (38.46%) used a highest score of 3, and two used a highest score of 0 (15.38%). There is a 61.54% difference between theoretical and actual highest scores. Although high scores mean higher risk in this case and the user would value lower scores, this metric is purely revealing the discrepancies between theoretical and actual values from what one would assume to be the Likert scale for the associated criterion at first glance.

Table 9. 163rd Attack Wing Risk-Based Sampling Strategy Scaling Criteria Highest Score

Score	Possible (#)	Possible (%)	Used (#)	Used (%)	Discrepancy
0	0	0.00%	2	15.38%	15.38%
3	3	23.08%	5	38.46%	15.38%
4	2	15.38%	2	15.38%	0.00%
5	8	61.54%	4	30.77%	30.77%
Total	13	100.00%	13	100.00%	61.54%

Table 10. 163rd Attack Wing Risk-Based Sampling Strategy Scaling Criteria Groups

x-Point Scale	Possible (#)	Possible (%)	Used (#)	Used (%)	Discrepancy
1	0	0	2	15.38%	15.38%
2	3	23.08%	3	23.08%	0.00%
3	2	15.38%	5	38.46%	23.08%
4	3	23.08%	2	15.38%	7.69%
5	5	38.46%	1	7.69%	30.77%
Total	13	100.00%	13	100.00%	76.92%

Just like its successor the 129th RQW RBSS, the highest theoretical score does not translate into the theoretical Likert scale used as the possible values defined are not contiguous. The data reveals that the theoretical values for the scale were clustered into two to five groups (Table 10). Five (38.46%) criteria use a 5-point Likert scale, three (23.08%) use a 4-point Likert scale, two (15.38%) use a 3-point Likert scale and three (23.08%) use a dichotomous scale. The actual assessment values were clustered into one to five groups. One (7.69%) criterion use a 5-point Likert scale, two (15.38%) use a 4-point Likert scale, five (38.46%) use a 3-point Likert scale, three (23.08%) use a dichotomous scale, and two (15.38%) use a 1-point scale. The two criteria with an actual 1-point scale reveals that they did not contribute to the decision as all units received the same score. As such, these criteria could be considered for elimination. The actual metrics show a 76.92% discrepancy between the theoretical scale and the actual scale, which is almost identical to discrepancy the 129th RQW had of 76.19%.

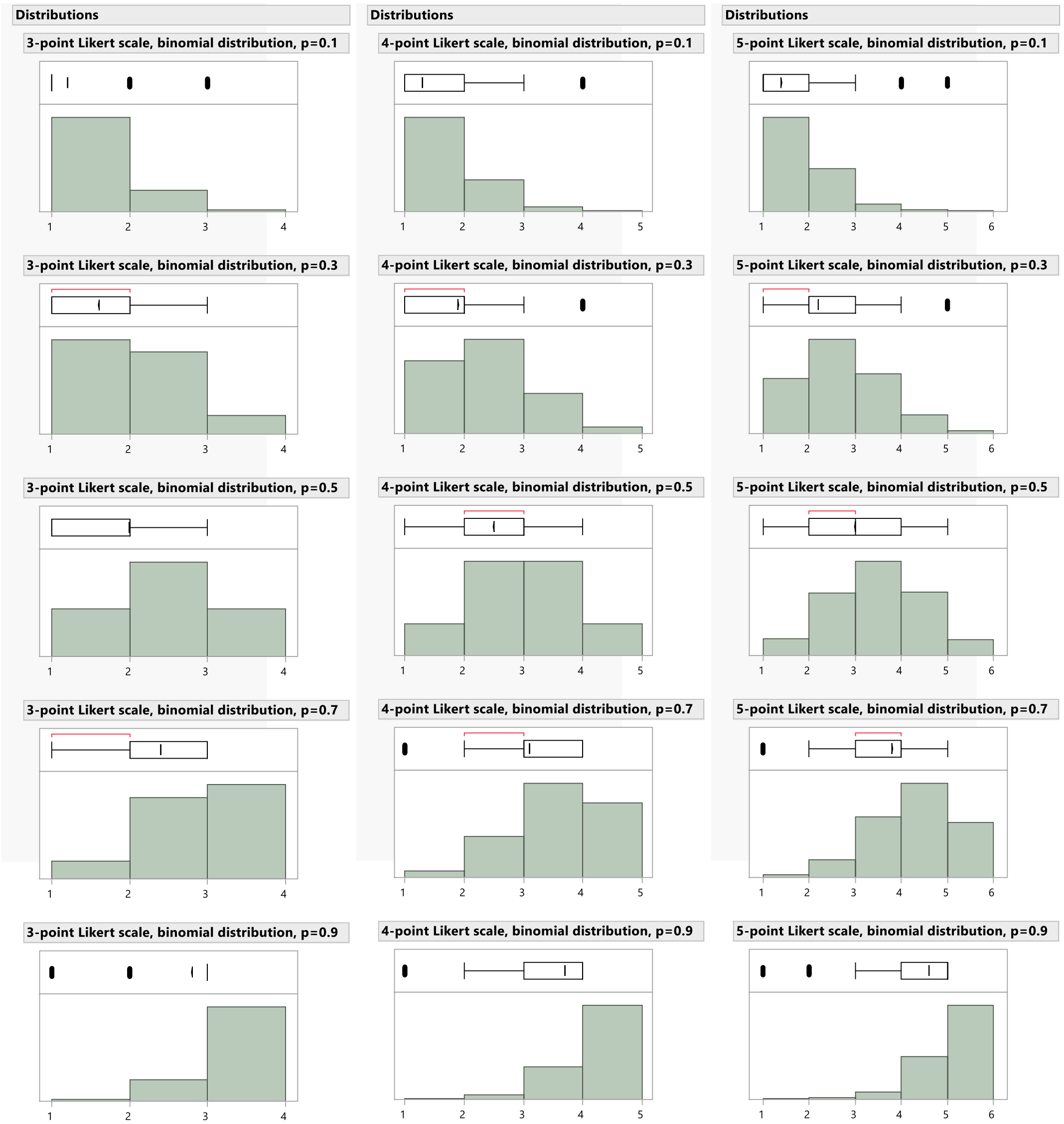
Considering how responses to the criteria were grouped, the most common scale used by both wings was 3. For the 129th RQW, the next most common scale used was 4 followed by 2 and 5. For the 163rd ATKW, the next most common scale used was 2, followed by 4, and 5. As the data suggests, we need to consider a 3- to 5-point Likert scale in our simulation. For simplicity, Likert scales will not be mixed in the simulation process. We do not consider using purely dichotomous variables in our simulation for it is very unlikely that operational units will do that since it lacks the detail required to help make informed decisions. Interesting to note, both wings used approximately 23% dichotomous responses in their assessments. We will further explore the dichotomous variable and its optimal values (or ranges) when summed with values from that of either a 3-point, 4-point, or 5-point Likert scale.

Binomial Distribution

We choose a binomial distribution to model the theoretical patterns for each criterion. To use the binomial distribution, two elements are required: the probability of success (p) and the number of trials (n). For our study, we define the number of trials as the number of possible responses in the selected Likert scale and the probability of success as the chance of scoring the theoretical high on the scale. Although the binomial distribution has a set definition of probability of success, our study focuses on the visual patterns of the distributions for varying values of p instead since units may have differing definitions of success. One unit may consider high scores as success while another may use a reverse Likert scale and consider low scores as success. As such, it would be misleading to always call the low values failures.

To get the theoretical distributions/shape of different probabilities of success, we used JMP Pro 15 and a binomial distribution to simulate data. For a Binomial (n, p) distribution, n is the number of trials (including 0) and p is the probability of success. Starting with a 5-point Likert scale and random sample size of 100,000, we generate a random binomial modifying the formula to: Random Binomial (4, p) + 1. With an $n = 4$, we get values between 0 and 4. Since we are interested in values between 1 and 5 for a 5-point Likert scale, we add 1 to the formula, essentially shifting the values to match the Likert scale of interest.

We use different values of p, ranging from 0.1 to 0.9 in increments of 0.2 to generate the theoretical distributions varying the degree of skewness in the pattern. Skewness refers to the asymmetry of the distribution due to the mean's position relative to the tails of the distribution. If the mean is closer to the left-tail, the distribution is skewed left and vice versa. However, we want to focus on where the data is dominantly portrayed in the distribution, so we will use the term dominant to describe the varying distributions. When $p = 0.1$, the distribution is very left-tail dominant where most of the data resides in the lowest value. When $p = 0.3$, the distribution is somewhat left-tail dominant where most of the data resides in the lower values. When $p = 0.5$, the distribution is central dominant where most of the data resides in the center. When $p = 0.7$, the distribution is somewhat right-tail dominant where most of the data resides in the higher values. When $p = 0.9$, the distribution is very right-tail dominant where most of the data resides in the highest value. The distributions when $p = 0.1$ and $p = 0.9$ are mirror images of each other as are the distributions of $p = 0.3$ and $p = 0.7$. We repeated the process for generating the theoretical distributions for the 3-point and 4-point Likert scales.



p	Data Dominance
0.1	Very left-tail
0.3	Somewhat left-tail
0.5	Central
0.7	Somewhat right-tail
0.9	Very right-tail

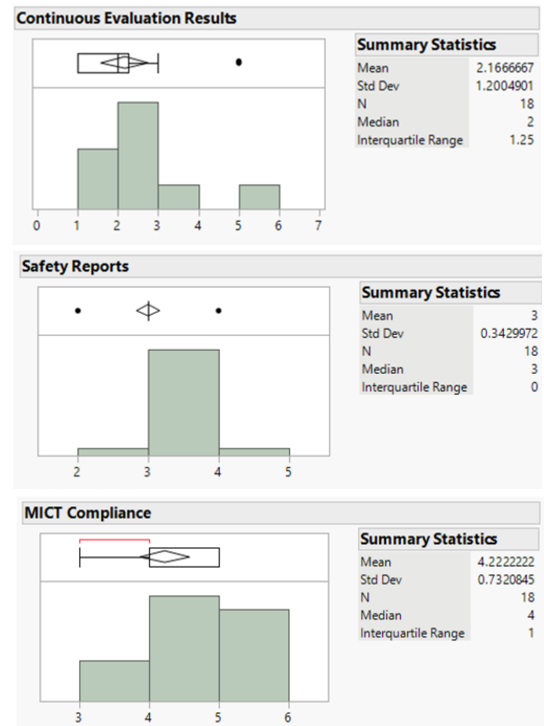


Figure 12. Theoretical and Actual Binomial Distribution for 3-, 4- and 5-point Likert Scales

Figure 12 shows the theoretical distributions for the 3-, 4-, and 5-point Likert scales (from left to right) along with the patterns of *p* for 0.1, 0.3, 0.5, 0.7, and 0.9 (from top to bottom), a table describing the different data dominance patterns, as well as some examples of actual criteria distributions for easy comparison. The graphs of select criterion on the right side of Figure 12 (from top to bottom) have a *p* of approximately 0.3, 0.5, and 0.7, respectively, when compared to their theoretical counterparts. See Appendices B and C for the graphs and descriptive statistics of every criterion used by the 129th RQW and 163rd ATKW, respectively.

Aside from displaying the patterns for each individual criterion, the binomial distribution can also illustrate the theoretical pattern on our response variable, the sum of all criteria. As previously stated, we assume that each criterion is an independent binomial with the same probability of success. The sum of independent binomials with the same probability of success is also a binomial (Casella & Berger, 2002).

$$x_1 \sim Bin(n_1, p)$$

$$x_2 \sim Bin(n_2, p)$$

If x_1 and x_2 are independent, then $x_3 = x_1 + x_2$.

$$x_3 \sim Bin(n_1 + n_2, p)$$

In our study, *x* represents an evaluation criterion, *n* represents the possible outcomes of a specific Likert scale (modified to remove the 0 value in the binomial) and *p* represents the probability of success.

Data Simulation

With our four input variables and values of interest defined, we can simulate our data in JMP Pro 15. The number of organizational units have three values (10, 15, and 20). The number of criteria have five values (5, 10, 15, 20, and 25). The Likert scale has three values (3-point, 4-

point, and 5-point). The probability of success (for the binomial random variable) has five values (0.1, 0.3, 0.5, 0.7, and 0.9). We will explain the process for simulating data for a 5-point Likert scale RBSS for a wing who has 10 units to inspect. This process is repeated eight more times to capture data for all nine combinations of number of units and Likert scales.

In JMP Pro 15, we generate a Full Factorial Design structure. The response variable is named sum to represent the sum of all criteria scores per organizational unit. We create three continuous factors: criteria, skewness, and repetitions. Criteria represents the number of evaluation criteria and has five levels: 5, 10, 15, 20, and 25. Skewness represents the different binomial probabilities of success and has five levels: 0.1, 0.3, 0.5, 0.7, and 0.9. Repetitions represent the simulation sample size and we choose a value 10,000. A 5x5x10000 factorial yields 250,000 runs. We keep the run order the same for the experiment. The number of replicates represent one less than the number of units for which we want to simulate data. For example, if we are interested in simulating 10 units, we would use nine replicates as nine plus the original one equals 10 units, which generates 2.5 million rows of data. We would change the number of replicates to 14 for 15 units and 19 for 20 units, which generates 3.75 million and 5 million rows of data, respectively.

Next, we make a table for our factorial design. We insert a formula for our response variable, the sum, and tie in all variables of interest. The generic formula for the sum where n is one less than the Likert point scale of interest, k is the number of criteria and p is the skewness is:

$$\text{Random Binomial}\ (n*k,\ p) + k$$

Following the assignment convention in our factorial design, the formula for the sum using a 5-point Likert scale is:

Random Binomial (4*Criteria, Skewness) + Criteria

We create a new table to obtain the aggregate statistics (mean, median, and standard deviation of the sum) for our data, grouping them by criteria, skewness, and repetition. This new table does not include the simulated individual unit total scores, so we used an inner join structured query language command to merge the original data table and the aggregate statistics so that all data are merged into one table. We next calculate our statistics of interest, the S-score and M-score.

Standardized Scores

The most important metric in the RBSS is how users define risk groups. The current process for both the 129th RQW and the 163rd ATKW is using a standardized score about a mean, which we call the S-score, where *sum* is an individual organizational unit's total score and *mean(sum)* and *stdev(sum)* are the mean and standard deviation of all organizational unit total scores under a wing.

$$S - score \ = \frac{sum \ - \ mean(sum)}{stdev(sum)}$$

For comparison, we also consider the M-score, which replaces *mean(sum)* with the median of all organizational unit total scores under a wing or *median(sum)* in the S-score calculation.

$$M - score \ = \frac{sum \ - \ median(sum)}{stdev(sum)}$$

As we demonstrate in Chapter 4, the S-score can be affected by the non-symmetry of criteria responses. The M-score is invariant to this non-symmetry. After both the S-score and M-score are calculated for each row, we create a metric called data dominance for both the S-score and M-score, which identifies where the data lies relative to the mean or median. If the S-score/M-score is greater than 0, then it will be defined as upper or right-tail dominance. If the S-score/M-score is less than 0, then it will be defined as lower or left-tail dominance. If the S-score/M-score is 0, which means *sum* is the same as *mean(sum)/median(sum)*, then it will be defined as center or central dominance.

To demonstrate how the S-score and M-score are affected by the pattern of Likert scale responses (for example right or left dominant), we compare the differences between the percentages of sums with upper data dominance to those with lower data dominance. As shown in the next chapter, the S-scores are affected by the tail-dominance of criteria responses while the M-scores are invariant. To determine which factors (i.e., organizational units, criteria, Likert scale values and skewness) affect the non-symmetry of upper and lower percentages, we perform a multiple regression analysis. From there, we present a Pareto Analysis indicating the order and relative magnitude of the significant variables. We use an alpha of 0.05 for this regression analysis.

Percent Contribution to the Response Variable

Although not directly associated with investigating how the S-score performs in RBSS as discussed in Chapter 2, we noted that the values of the dichotomous variable (1 and an upper value) could be overinfluential in the sum of the criteria with respect to percent contribution. Consequently, we investigate varying the upper value of the dichotomous variable to determine which integer value (we assume that users will not be amiable to using fractional values to scale disparate criteria scores) will come closer to the optimal value of what each question should represent of the sum.

To perform this analysis, we use the mean and variance for each respective Likert scale to determine its actual percent contribution to the response. The mean (μ) or expected value ($E(x)$) of a discrete random variable is

$$\mu = E(x) = \sum xp(x)$$

where x is a random variable and $p(x)$ is its associated probability. Multiplying each possible value of x by its associated probability and summing this product over all possible values of x returns the expected value (McClave et al., 2018). The variance of a discrete random variable is defined as the average of the squared distance of x from the mean and denoted as:

$$\sigma^2 = E[(x-\mu)^2] = \sum (x-\mu)^2\, p(x)$$

The percent contribution of a particular criterion can be found using R^2, which represents the percent of total variation that can be explained by the model.

$$\%\, Contribution = R^2 = \frac{Explained\ Variance}{Total\ Variance}$$

When using the same Likert scale, all criteria will have an equal probability of occurrence and contribute equally to the model. It is mathematically impossible for a 3-point, 4-point and 5-point Likert scale to contribute equally to a sum without using scaling. For example, if we want a 4-point Likert criterion to contribute equally to a 5-point Likert criterion, we will have to multiply the 4-point Likert criterion by 5 and divide the answer by 4. The more criteria the more complicated this scaling process will be, which makes it less likely for the user to adopt such an approach.

Dichotomous Variable

We can, however, explore the combination of a 3-, 4-, or 5-point Likert scale with a dichotomous variable as users try to force a dichotomous variable into another Likert scale. To match a 3-point scale, one could use the values 1 and 3. To match a 5-point scale, the values of 1 and 5 could be used. It appears from our data that the highest and lowest scores are commonly used to represent the responses “yes” and “no.” However, no rule states what values must be used for a dichotomous variable.

For example, consider the case of 10 criteria, eight of which uses a 5-point Likert scale and two of which uses a dichotomous scale. With our assumption of equal contribution, the theoretical contribution of each criterion is 1/10 or 0.1. We can mathematically derive the actual contribution when using a combination of dichotomous and 5-point Likert scales, using the commonly used values of 1 and 5 to represent the dichotomous variable. If we want to know the percent contribution of the 5-point criteria, we calculate the explained variance in the numerator, which is the product of the number of 5-point criterion and its variance, and divide by the denominator, which is the sum of the product of the number of 5-point criteria and its variance and the product of the number of dichotomous criteria and its variance. If we want to know the percent contribution of the dichotomous criteria, we will replace the numerator with product of the dichotomous criteria and its variance, keeping the denominator the same. For a 5-point Likert scale, we can change the values used to represent the dichotomous variable and see if the percent contribution changes. For example, these 10 combinations can be used to represent the dichotomous variable: 1 and 2, 1 and 3, 1 and 4, 1 and 5, 2 and 3, 2 and 4, 2 and 5, 3 and 4, 3 and 5, and 4 and 5.

The process will be repeated varying the number of criteria and the ratio of dichotomous criteria to Likert criteria (3-point and 4-point). If the percent contribution, in fact, changes, we can define rules that will help the user select the most optimal values to represent the dichotomous variable such that all criteria are approximately equally represented in the sum. We discuss those results in Chapter 4.

Summary

In this chapter, we descriptively examine the RBSS data from the 129th RQW and 163rd ATKW to determine the range of values we need to use for our simulation. The variables of interest include the number of organizational units, number of criteria, scales for each criterion, and the probability of success. Our response of interest is the sum of the criteria responses. We define the S-score and M-score and how we intend to analyze these values to ascertain how they are affected by criteria responses that are non-symmetric. Lastly, we discuss how we intend to investigate varying the upper value of a dichotomous variable and its effect relative to percent contribution to the entire sum of criteria responses. In the next chapter, we present the results of our simulation as well as the recommended range for a dichotomous variable.

IV. Analysis and Results

Chapter Overview

In this chapter, we discuss the results of our simulation and dichotomous variable investigation. We analyze our simulated data using the S-score, our proposed M-score and compare the results of the two standardized scores centering data about the mean and median, respectively. In addition, we reveal whether the values selected to represent the dichotomous variables change its percent contribution to the response variable. We also suggest the optimal range for a dichotomous variable for Likert scales of 3 to 5.

Standardized Scores

As a reminder, we use the following four variables in our simulation: the number of organizational units, number of criteria, scales for each criterion, and the probability of success. The number of units can be 10, 15 or 20. The number of criteria can have values of 5, 10, 15, 20, and 25. We use a 3-point, 4-point or 5-point Likert scale. The probability of success can be 0.1, 0.3, 0.5, 0.7, and 0.9. Simulation resulted in 2.5 million rows of data for 10 units, 3.75 million for 15 units, and 5 million for 20 units. We want to see where the data predominantly lies for our S-score/M-score, which could be below the mean/median, at the mean/median or above the mean/median. We group the results of our data by criteria and skewness, both of which have five possible values. This presents 25 simulation results for each organizational grouping (10, 15, or 20). Each is a culmination of 100,000 outcomes for 10 units, 150,000 for 15 units, and 200,000 for 20 units (since we have 10,000 reps per individual outcome).

When observing the S-score patterns, the percentage of data in the two tail groups are not equal and there are very few values present in the center group, which indicates the distribution is skewed when evaluating about the mean. In other words, the distribution is generally not normal. Although the 129th RQW and 163rd ATKW never explicitly stated that they assumed a normal distribution, their process for grouping data into risk groups heavily suggests use of the Empirical Rule (Figures 3 and 6), which requires a normal distribution.

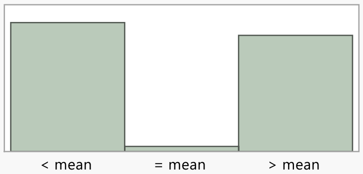
As described in Chapter 3, the M-score is a modification of the S-score. Instead of looking at where data lies relative to the mean, we consider where the data lies relative to the median. By definition, the median value is the 50th percentile of a dataset and splits the data in half. With the median centered at 0 for the M-score, it fixes the issue of data skewing in the S-score.

We present the results of the M-score alongside the S-score for side-by-side comparison. Due to the extensive number of pages (45) required to show all graphs (see Appendix D), we have selected one as an example. The selected graph (Figure 13) uses a 3-point Likert scale with 15 criteria and 20 units. It is chosen as an example since both the 129th RQW and 163rd ATKW use a 3-point Likert scale the most, the two averaged closest to 15 criteria in their RBSS, and both have closest to 20 organizational units for inspection. The skewness levels of 0.1 and 0.9 are mirror images of each other as are the skewness levels of 0.3 and 0.7. The data is less skewed as it approaches 0.5 where it finally resembles a normal distribution.

When using the S-score, data dominance for both tails are not equal; however, they are relatively equal when using the M-score. Also, using the M-score reveals a more defined central dominance group compared to the S-score. Tables 11-13 displays the data dominance percentages for both S-scores and M-scores for all graphs.

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

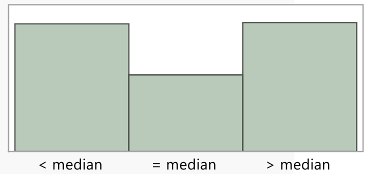


Frequencies

Level	Count	Prob
< mean	103896	0.51948
= mean	2973	0.01487
> mean	93131	0.46566
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



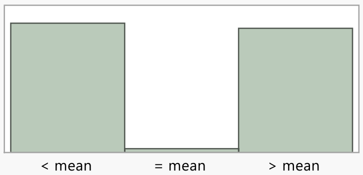
Frequencies

Level	Count	Prob
< median	76794	0.38397
= median	45880	0.22940
> median	77326	0.38663
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

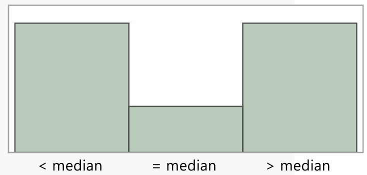


Frequencies

Level	Count	Prob
< mean	101049	0.50525
= mean	1561	0.00781
> mean	97390	0.48695
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



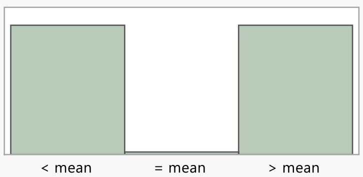
Frequencies

Level	Count	Prob
< median	84800	0.42400
= median	29996	0.14998
> median	85204	0.42602
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

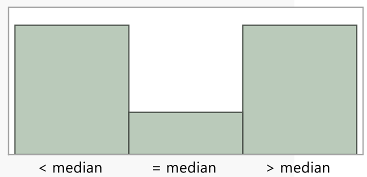


Frequencies

Level	Count	Prob
< mean	99442	0.49721
= mean	1440	0.00720
> mean	99118	0.49559
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



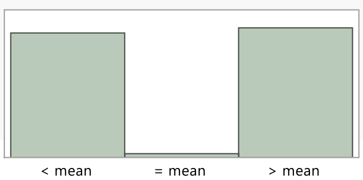
Frequencies

Level	Count	Prob
< median	86224	0.43112
= median	27460	0.13730
> median	86316	0.43158
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

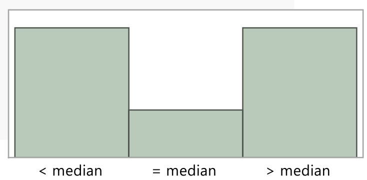


Frequencies

Level	Count	Prob
< mean	97265	0.48633
= mean	1588	0.00794
> mean	101147	0.50574
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



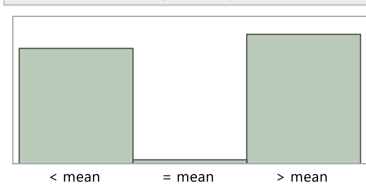
Frequencies

Level	Count	Prob
< median	84873	0.42437
= median	30389	0.15195
> median	84738	0.42369
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

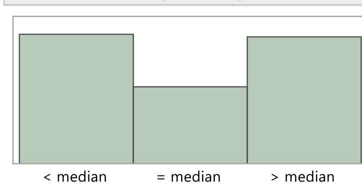


Frequencies

Level	Count	Prob
< mean	92825	0.46413
= mean	2613	0.01307
> mean	104562	0.52281
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



Frequencies

Level	Count	Prob
< median	77793	0.38897
= median	45596	0.22798
> median	76611	0.38306
Total	200000	1.00000

N Missing 0
3 Levels

Figure 13. Data Dominance Comparison Between S-score and M-score

Table 11. Comparison of S-score and M-score for 3-Point Likert Scale

Units	Criteria	Skewness Level	Distance from Center	S-score < mean	S-score = mean	S-score > mean	M-score < median	M-score = median	M-score > median	Difference between median and mean	S-score tail difference	M-score tail difference
10	5	0.1	0.4	0.5083	0.05751	0.43419	0.31335	0.36976	0.31688	0.31225	0.07411	0.00353
10	5	0.3	0.2	0.50201	0.02907	0.46892	0.37618	0.24277	0.38105	0.2137	0.03309	0.00487
10	5	0.5	0	0.48859	0.02538	0.48603	0.38471	0.22927	0.38602	0.20389	0.00256	0.00131
10	5	0.7	0.2	0.47089	0.03047	0.49864	0.37874	0.24556	0.3757	0.21509	0.02775	0.00304
10	5	0.9	0.4	0.43757	0.05442	0.50801	0.31907	0.36741	0.31352	0.31299	0.07044	0.00555
10	10	0.1	0.4	0.51686	0.02998	0.45316	0.36262	0.26547	0.37191	0.23549	0.0637	0.00929
10	10	0.3	0.2	0.50065	0.02045	0.4789	0.40932	0.17863	0.41205	0.15818	0.02175	0.00273
10	10	0.5	0	0.48992	0.01868	0.4914	0.41892	0.1626	0.41848	0.14392	0.00148	0.00044
10	10	0.7	0.2	0.47857	0.02124	0.50019	0.41135	0.17822	0.41043	0.15698	0.02162	0.00092
10	10	0.9	0.4	0.45358	0.03207	0.51435	0.3719	0.26312	0.36498	0.23105	0.06077	0.00692
10	15	0.1	0.4	0.51379	0.02591	0.4603	0.38733	0.22077	0.3919	0.19486	0.05349	0.00457
10	15	0.3	0.2	0.50038	0.01668	0.48294	0.42769	0.14397	0.42834	0.12729	0.01744	0.00065
10	15	0.5	0	0.4942	0.01469	0.49111	0.43365	0.13202	0.43433	0.11733	0.00309	0.00068
10	15	0.7	0.2	0.48239	0.01698	0.50063	0.42761	0.14537	0.42702	0.12839	0.01824	0.00059
10	15	0.9	0.4	0.46019	0.02532	0.51449	0.39092	0.22299	0.38609	0.19767	0.0543	0.00483
10	20	0.1	0.4	0.51386	0.02174	0.4644	0.40072	0.19524	0.40404	0.1735	0.04946	0.00332
10	20	0.3	0.2	0.50235	0.01397	0.48368	0.43528	0.12928	0.43544	0.11531	0.01867	0.00016
10	20	0.5	0	0.49209	0.01275	0.49516	0.44176	0.11574	0.4425	0.10299	0.00307	0.00074
10	20	0.7	0.2	0.48335	0.01467	0.50198	0.4371	0.12586	0.43704	0.11119	0.01863	6E-05
10	20	0.9	0.4	0.46503	0.02088	0.51409	0.40605	0.19001	0.40394	0.16913	0.04906	0.00211
10	25	0.1	0.4	0.51124	0.02041	0.46835	0.41254	0.1734	0.41406	0.15299	0.04289	0.00152
10	25	0.3	0.2	0.50163	0.01332	0.48505	0.44327	0.11365	0.44308	0.10033	0.01658	0.00019
10	25	0.5	0	0.4931	0.01267	0.49423	0.44738	0.10511	0.44751	0.09244	0.00113	0.00013
10	25	0.7	0.2	0.48834	0.01227	0.49939	0.44363	0.11211	0.44426	0.09984	0.01105	0.00063
10	25	0.9	0.4	0.47108	0.0198	0.50912	0.41549	0.17196	0.41255	0.15216	0.03804	0.00294
15	5	0.1	0.4	0.51374	0.04537	0.44089	0.29082	0.42695	0.28223	0.38158	0.07285	0.00859
15	5	0.3	0.2	0.50731	0.02003	0.47267	0.34239	0.31179	0.34583	0.29176	0.03464	0.00344
15	5	0.5	0	0.48978	0.01849	0.49173	0.35157	0.29564	0.35279	0.27715	0.00195	0.00122
15	5	0.7	0.2	0.47385	0.02086	0.50529	0.34483	0.31222	0.34295	0.29136	0.03144	0.00188
15	5	0.9	0.4	0.44036	0.04476	0.51488	0.28327	0.42694	0.28979	0.38218	0.07452	0.00652
15	10	0.1	0.4	0.52003	0.02365	0.45631	0.32909	0.3342	0.33671	0.31055	0.06372	0.00762
15	10	0.3	0.2	0.50457	0.01339	0.48205	0.37753	0.24452	0.37795	0.23113	0.02252	0.00042
15	10	0.5	0	0.49209	0.013	0.49491	0.38579	0.22915	0.38506	0.21615	0.00282	0.00073
15	10	0.7	0.2	0.48156	0.01306	0.50538	0.37851	0.24535	0.37613	0.23229	0.02382	0.00238
15	10	0.9	0.4	0.45415	0.02395	0.5219	0.33769	0.33502	0.32729	0.31107	0.06775	0.0104
15	15	0.1	0.4	0.51949	0.01697	0.46353	0.35287	0.28827	0.35885	0.2713	0.05596	0.00598
15	15	0.3	0.2	0.50385	0.01161	0.48453	0.39207	0.21347	0.39446	0.20186	0.01932	0.00239
15	15	0.5	0	0.49421	0.00998	0.49581	0.39977	0.20119	0.39904	0.19121	0.0016	0.00073
15	15	0.7	0.2	0.48434	0.01135	0.50431	0.39371	0.21414	0.39215	0.20279	0.01997	0.00156
15	15	0.9	0.4	0.465	0.01713	0.51787	0.35995	0.2885	0.35155	0.27137	0.05287	0.0084
15	20	0.1	0.4	0.51736	0.01499	0.46765	0.36858	0.25932	0.3721	0.24433	0.04971	0.00352
15	20	0.3	0.2	0.50429	0.00942	0.48629	0.40203	0.19499	0.40298	0.18557	0.018	0.00095
15	20	0.5	0	0.49683	0.00873	0.49445	0.4093	0.1823	0.4084	0.17357	0.00238	0.0009
15	20	0.7	0.2	0.48747	0.00937	0.50316	0.40377	0.19427	0.40197	0.1849	0.01569	0.0018
15	20	0.9	0.4	0.46671	0.01475	0.51853	0.37271	0.26023	0.36706	0.24548	0.05182	0.00565
15	25	0.1	0.4	0.5154	0.01234	0.47226	0.37893	0.24073	0.38034	0.22839	0.04314	0.00141
15	25	0.3	0.2	0.50265	0.00828	0.48907	0.40795	0.18245	0.4096	0.17417	0.01358	0.00165
15	25	0.5	0	0.49566	0.00725	0.49709	0.41415	0.17215	0.4137	0.1649	0.00143	0.00045
15	25	0.7	0.2	0.48701	0.00793	0.50505	0.41035	0.18113	0.40853	0.1732	0.01804	0.00182
15	25	0.9	0.4	0.47081	0.013	0.51619	0.38075	0.24171	0.37754	0.22871	0.04538	0.00321
20	5	0.1	0.4	0.52031	0.03638	0.44332	0.32378	0.38228	0.29394	0.3459	0.07699	0.02984
20	5	0.3	0.2	0.50602	0.01672	0.47727	0.3724	0.25592	0.37169	0.2392	0.02875	0.00071
20	5	0.5	0	0.49219	0.01519	0.49263	0.38204	0.23487	0.3831	0.21968	0.00044	0.00106
20	5	0.7	0.2	0.47859	0.01673	0.50469	0.37147	0.25442	0.37412	0.23769	0.0261	0.00265
20	5	0.9	0.4	0.44321	0.03595	0.52085	0.29429	0.38196	0.32376	0.34601	0.07764	0.02947
20	10	0.1	0.4	0.52055	0.02047	0.45899	0.36442	0.27453	0.36106	0.25406	0.06156	0.00336
20	10	0.3	0.2	0.50554	0.01046	0.484	0.40745	0.18373	0.40883	0.17327	0.02154	0.00138
20	10	0.5	0	0.49634	0.00865	0.49501	0.41535	0.16857	0.41609	0.15992	0.00133	0.00074
20	10	0.7	0.2	0.48453	0.01025	0.50523	0.40878	0.18365	0.40758	0.1734	0.0207	0.0012
20	10	0.9	0.4	0.45792	0.01861	0.52347	0.36055	0.27739	0.36206	0.25878	0.06555	0.00151
20	15	0.1	0.4	0.51948	0.01487	0.46566	0.38397	0.2294	0.38663	0.21453	0.05382	0.00266
20	15	0.3	0.2	0.50525	0.00781	0.48695	0.424	0.14998	0.42602	0.14217	0.0183	0.00202
20	15	0.5	0	0.49721	0.0072	0.49559	0.43112	0.1373	0.43158	0.1301	0.00162	0.00046
20	15	0.7	0.2	0.48633	0.00794	0.50574	0.42437	0.15195	0.42369	0.14401	0.01941	0.00068
20	15	0.9	0.4	0.46413	0.01307	0.52281	0.38897	0.22798	0.38306	0.21491	0.05868	0.00591
20	20	0.1	0.4	0.52055	0.01089	0.46856	0.39856	0.19988	0.40157	0.18899	0.05199	0.00301
20	20	0.3	0.2	0.5051	0.00707	0.48784	0.43514	0.12984	0.43502	0.12277	0.01726	0.00012
20	20	0.5	0	0.49575	0.00672	0.49754	0.4404	0.12007	0.43953	0.11335	0.00179	0.00087
20	20	0.7	0.2	0.48726	0.00762	0.50512	0.43545	0.13077	0.43379	0.12315	0.01786	0.00166
20	20	0.9	0.4	0.47086	0.01123	0.51792	0.40196	0.19906	0.39899	0.18783	0.04706	0.00297
20	25	0.1	0.4	0.51682	0.00928	0.47391	0.40996	0.17753	0.41252	0.16825	0.04291	0.00256
20	25	0.3	0.2	0.50345	0.00588	0.49067	0.4417	0.11678	0.44152	0.1109	0.01278	0.00018
20	25	0.5	0	0.49736	0.00644	0.49621	0.44638	0.10655	0.44708	0.10011	0.00115	0.0007
20	25	0.7	0.2	0.49008	0.00602	0.50391	0.4423	0.1158	0.44191	0.10978	0.01383	0.00039
20	25	0.9	0.4	0.47136	0.00951	0.51914	0.41305	0.17816	0.4088	0.16865	0.04778	0.00425

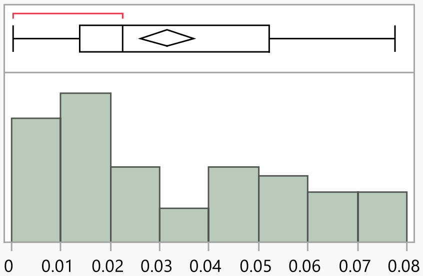
Table 12. Comparison of S-score and M-score for 4-Point Likert Scale

Units	Criteria	Skewness Level	Distance from Center	S-score < mean	S-score = mean	S-score > mean	M-score < median	M-score = median	M-score > median	Difference between median and mean	S-score tail difference	M-score tail difference
10	5	0.1	0.4	0.53035	0.0293	0.44035	0.33718	0.30675	0.35607	0.27745	0.09	0.01889
10	5	0.3	0.2	0.49905	0.0251	0.47585	0.39641	0.20576	0.39783	0.18066	0.0232	0.00142
10	5	0.5	0	0.48804	0.02292	0.48904	0.40469	0.18828	0.40703	0.16536	0.001	0.00234
10	5	0.7	0.2	0.47701	0.02311	0.49988	0.39684	0.20771	0.39545	0.1846	0.02287	0.00139
10	5	0.9	0.4	0.44241	0.02842	0.52917	0.35305	0.31131	0.33564	0.28289	0.08676	0.01741
10	10	0.1	0.4	0.51591	0.02425	0.45984	0.38609	0.22136	0.39255	0.19711	0.05607	0.00646
10	10	0.3	0.2	0.49944	0.01616	0.4844	0.42728	0.14405	0.42867	0.12789	0.01504	0.00139
10	10	0.5	0	0.49286	0.01446	0.49268	0.43311	0.13326	0.43363	0.1188	0.00018	0.00052
10	10	0.7	0.2	0.48234	0.01616	0.5015	0.42694	0.14601	0.42705	0.12985	0.01916	0.00011
10	10	0.9	0.4	0.4594	0.02577	0.51483	0.39284	0.21874	0.38842	0.19297	0.05543	0.00442
10	15	0.1	0.4	0.51362	0.02066	0.46572	0.40794	0.18133	0.41073	0.16067	0.0479	0.00279
10	15	0.3	0.2	0.50182	0.01291	0.48527	0.43858	0.12229	0.43913	0.10938	0.01655	0.00055
10	15	0.5	0	0.49433	0.01259	0.49308	0.44648	0.10713	0.44639	0.09454	0.00125	9E-05
10	15	0.7	0.2	0.48597	0.01314	0.50089	0.44166	0.1176	0.44074	0.10446	0.01492	0.00092
10	15	0.9	0.4	0.46683	0.02176	0.51141	0.41054	0.18281	0.40665	0.16105	0.04458	0.00389
10	20	0.1	0.4	0.5107	0.01776	0.47154	0.42049	0.15688	0.42263	0.13912	0.03916	0.00214
10	20	0.3	0.2	0.5002	0.01137	0.48843	0.44837	0.10404	0.44759	0.09267	0.01177	0.00078
10	20	0.5	0	0.49487	0.01067	0.49446	0.45382	0.09278	0.4534	0.08211	0.00041	0.00042
10	20	0.7	0.2	0.48814	0.01188	0.49998	0.44742	0.10527	0.44731	0.09339	0.01184	0.00011
10	20	0.9	0.4	0.47101	0.01783	0.51116	0.42095	0.15983	0.41922	0.142	0.04015	0.00173
10	25	0.1	0.4	0.50742	0.01671	0.47587	0.42713	0.14421	0.42866	0.1275	0.03155	0.00153
10	25	0.3	0.2	0.50087	0.0101	0.48903	0.45312	0.09381	0.45307	0.08371	0.01184	5E-05
10	25	0.5	0	0.49516	0.0093	0.49554	0.45865	0.08299	0.45836	0.07369	0.00038	0.00029
10	25	0.7	0.2	0.49104	0.01012	0.49884	0.45462	0.09107	0.45431	0.08095	0.0078	0.00031
10	25	0.9	0.4	0.47645	0.01624	0.50731	0.43017	0.13994	0.42989	0.1237	0.03086	0.00028
15	5	0.1	0.4	0.53857	0.01601	0.44543	0.29233	0.37773	0.32993	0.36172	0.09314	0.0376
15	5	0.3	0.2	0.50655	0.01468	0.47877	0.36161	0.27227	0.36613	0.25759	0.02778	0.00452
15	5	0.5	0	0.49397	0.01389	0.49214	0.37091	0.25497	0.37412	0.24108	0.00183	0.00321
15	5	0.7	0.2	0.47977	0.01557	0.50467	0.36461	0.27125	0.36414	0.25568	0.0249	0.00047
15	5	0.9	0.4	0.44499	0.01509	0.53992	0.32931	0.3775	0.29319	0.36241	0.09493	0.03612
15	10	0.1	0.4	0.51898	0.01843	0.46259	0.35184	0.28671	0.36145	0.26828	0.05639	0.00961
15	10	0.3	0.2	0.50379	0.01035	0.48586	0.39362	0.21219	0.39419	0.20184	0.01793	0.00057
15	10	0.5	0	0.49585	0.01044	0.49371	0.39902	0.20055	0.40043	0.19011	0.00214	0.00141
15	10	0.7	0.2	0.48488	0.01112	0.504	0.39417	0.21337	0.39247	0.20225	0.01912	0.0017
15	10	0.9	0.4	0.46306	0.01769	0.51925	0.36016	0.28929	0.35055	0.2716	0.05619	0.00961
15	15	0.1	0.4	0.51641	0.01384	0.46975	0.37451	0.24843	0.37706	0.23459	0.04666	0.00255
15	15	0.3	0.2	0.50446	0.0085	0.48704	0.40659	0.18678	0.40663	0.17828	0.01742	4E-05
15	15	0.5	0	0.4957	0.00841	0.49589	0.41123	0.17639	0.41238	0.16798	0.00019	0.00115
15	15	0.7	0.2	0.48735	0.00814	0.50451	0.40675	0.18751	0.40574	0.17937	0.01716	0.00101
15	15	0.9	0.4	0.47037	0.01323	0.51639	0.37713	0.24936	0.37351	0.23613	0.04602	0.00362
15	20	0.1	0.4	0.51433	0.01198	0.47369	0.38569	0.22692	0.38739	0.21494	0.04064	0.0017
15	20	0.3	0.2	0.50239	0.00744	0.49017	0.4139	0.17185	0.41425	0.16441	0.01222	0.00035
15	20	0.5	0	0.49634	0.00665	0.49701	0.41878	0.16325	0.41797	0.1566	0.00067	0.00081
15	20	0.7	0.2	0.48858	0.00732	0.5041	0.41504	0.17059	0.41437	0.16327	0.01552	0.00067
15	20	0.9	0.4	0.47316	0.0121	0.51474	0.38953	0.22611	0.38437	0.21401	0.04158	0.00516
15	25	0.1	0.4	0.51361	0.01097	0.47543	0.39505	0.20891	0.39604	0.19794	0.03818	0.00099
15	25	0.3	0.2	0.50189	0.00737	0.49075	0.41993	0.15968	0.42039	0.15231	0.01114	0.00046
15	25	0.5	0	0.49561	0.0068	0.49759	0.42391	0.15328	0.42281	0.14648	0.00198	0.0011
15	25	0.7	0.2	0.48921	0.00692	0.50387	0.41957	0.16146	0.41897	0.15454	0.01466	0.0006
15	25	0.9	0.4	0.47556	0.01074	0.5137	0.39738	0.20914	0.39348	0.1984	0.03814	0.0039
20	5	0.1	0.4	0.54446	0.00806	0.44749	0.32117	0.31599	0.36285	0.30793	0.09697	0.04168
20	5	0.3	0.2	0.50979	0.01056	0.47966	0.39448	0.20943	0.3961	0.19887	0.03013	0.00162
20	5	0.5	0	0.49565	0.00992	0.49443	0.40193	0.19393	0.40415	0.18401	0.00122	0.00222
20	5	0.7	0.2	0.4816	0.01016	0.50825	0.39676	0.21013	0.39312	0.19997	0.02665	0.00364
20	5	0.9	0.4	0.44492	0.0088	0.54629	0.36298	0.31991	0.31711	0.31111	0.10137	0.04587
20	10	0.1	0.4	0.52136	0.01355	0.4651	0.38471	0.22837	0.38693	0.21482	0.05626	0.00222
20	10	0.3	0.2	0.50566	0.00829	0.48605	0.42452	0.1498	0.42569	0.14151	0.01961	0.00117
20	10	0.5	0	0.49666	0.00724	0.49611	0.43087	0.13825	0.43088	0.13101	0.00055	1E-05
20	10	0.7	0.2	0.4864	0.00821	0.5054	0.42454	0.15068	0.42479	0.14247	0.019	0.00025
20	10	0.9	0.4	0.46599	0.01436	0.51966	0.38511	0.22946	0.38543	0.2151	0.05367	0.00032
20	15	0.1	0.4	0.52047	0.00976	0.46977	0.40477	0.18653	0.40871	0.17677	0.0507	0.00394
20	15	0.3	0.2	0.50558	0.00619	0.48823	0.43792	0.12328	0.43881	0.11709	0.01735	0.00089
20	15	0.5	0	0.49641	0.00636	0.49724	0.44263	0.11505	0.44233	0.10869	0.00083	0.0003
20	15	0.7	0.2	0.48906	0.00709	0.50386	0.43822	0.1238	0.43799	0.11671	0.0148	0.00023
20	15	0.9	0.4	0.47081	0.00881	0.52039	0.40962	0.18612	0.40426	0.17731	0.04958	0.00536
20	20	0.1	0.4	0.51669	0.00835	0.47497	0.41744	0.16378	0.41879	0.15543	0.04172	0.00135
20	20	0.3	0.2	0.50407	0.00541	0.49053	0.44604	0.10813	0.44584	0.10272	0.01354	0.0002
20	20	0.5	0	0.4969	0.0048	0.49831	0.45104	0.09819	0.45078	0.09339	0.00141	0.00026
20	20	0.7	0.2	0.49036	0.00578	0.50387	0.44635	0.10748	0.44617	0.1017	0.01351	0.00018
20	20	0.9	0.4	0.47525	0.00977	0.51499	0.41946	0.16315	0.4174	0.15338	0.03974	0.00206
20	25	0.1	0.4	0.51553	0.00767	0.47681	0.42551	0.14736	0.42714	0.13969	0.03872	0.00163
20	25	0.3	0.2	0.50315	0.00537	0.49149	0.45191	0.09721	0.45089	0.09184	0.01166	0.00102
20	25	0.5	0	0.4974	0.00496	0.49764	0.45539	0.0899	0.45472	0.08494	0.00024	0.00067
20	25	0.7	0.2	0.49122	0.00514	0.50364	0.45054	0.09822	0.45125	0.09308	0.01242	0.00071
20	25	0.9	0.4	0.47736	0.00784	0.51481	0.42796	0.14649	0.42556	0.13865	0.03745	0.0024

Table 13. Comparison of S-score and M-score for 5-Point Likert Scale

Units	Criteria	Skewness Level	Distance from Center	S-score < mean	S-score = mean	S-score > mean	M-score < median	M-score = median	M-score > median	Difference between median and mean	S-score tail difference	M-score tail difference
10	5	0.1	0.4	0.51577	0.03188	0.45235	0.36246	0.26644	0.3711	0.23456	0.06342	0.00864
10	5	0.3	0.2	0.50058	0.01931	0.48011	0.41153	0.17575	0.41272	0.15644	0.02047	0.00119
10	5	0.5	0	0.4905	0.01784	0.49166	0.41957	0.16181	0.41862	0.14397	0.00116	0.00095
10	5	0.7	0.2	0.47848	0.02027	0.50125	0.41264	0.17497	0.41239	0.1547	0.02277	0.00025
10	5	0.9	0.4	0.45563	0.03108	0.51329	0.36915	0.2689	0.36195	0.23782	0.05766	0.0072
10	10	0.1	0.4	0.51303	0.02132	0.46565	0.40343	0.19071	0.40586	0.16939	0.04738	0.00243
10	10	0.3	0.2	0.50056	0.01375	0.48569	0.43624	0.12777	0.43599	0.11402	0.01487	0.00025
10	10	0.5	0	0.49287	0.01295	0.49418	0.44285	0.11411	0.44304	0.10116	0.00131	0.00019
10	10	0.7	0.2	0.4838	0.01472	0.50148	0.43701	0.12704	0.43595	0.11232	0.01768	0.00106
10	10	0.9	0.4	0.46529	0.02246	0.51225	0.40515	0.19262	0.40223	0.17016	0.04696	0.00292
10	15	0.1	0.4	0.51113	0.01734	0.47153	0.41965	0.15747	0.42288	0.14013	0.0396	0.00323
10	15	0.3	0.2	0.49948	0.01159	0.48893	0.44707	0.10527	0.44766	0.09368	0.01055	0.00059
10	15	0.5	0	0.49449	0.01063	0.49488	0.45368	0.09311	0.45321	0.08248	0.00039	0.00047
10	15	0.7	0.2	0.48838	0.01113	0.50049	0.44781	0.10427	0.44792	0.09314	0.01211	0.00011
10	15	0.9	0.4	0.4738	0.01734	0.50886	0.42214	0.15678	0.42108	0.13944	0.03506	0.00106
10	20	0.1	0.4	0.50928	0.01586	0.47486	0.43183	0.13542	0.43275	0.11956	0.03442	0.00092
10	20	0.3	0.2	0.50071	0.01028	0.48901	0.45603	0.0878	0.45617	0.07752	0.0117	0.00014
10	20	0.5	0	0.49635	0.00863	0.49502	0.45861	0.08296	0.45843	0.07433	0.00133	0.00018
10	20	0.7	0.2	0.49016	0.01027	0.49957	0.45446	0.09062	0.45492	0.08035	0.00941	0.00046
10	20	0.9	0.4	0.47466	0.0166	0.50874	0.43289	0.13448	0.43263	0.11788	0.03408	0.00026
10	25	0.1	0.4	0.50832	0.01456	0.47712	0.43712	0.12524	0.43764	0.11068	0.0312	0.00052
10	25	0.3	0.2	0.50103	0.00925	0.48972	0.45999	0.07976	0.46025	0.07051	0.01131	0.00026
10	25	0.5	0	0.49527	0.00815	0.49658	0.46375	0.07262	0.46363	0.06447	0.00131	0.00012
10	25	0.7	0.2	0.49129	0.00851	0.5002	0.45928	0.08142	0.4593	0.07291	0.00891	2E-05
10	25	0.9	0.4	0.48061	0.01482	0.50457	0.43947	0.12247	0.43806	0.10765	0.02396	0.00141
15	5	0.1	0.4	0.51896	0.02463	0.45641	0.32981	0.33538	0.33481	0.31075	0.06255	0.005
15	5	0.3	0.2	0.50421	0.01374	0.48205	0.37571	0.24662	0.37767	0.23288	0.02216	0.00196
15	5	0.5	0	0.4948	0.01181	0.49339	0.38483	0.23119	0.38398	0.21938	0.00141	0.00085
15	5	0.7	0.2	0.48057	0.01337	0.50605	0.37957	0.24529	0.37514	0.23192	0.02548	0.00443
15	5	0.9	0.4	0.45591	0.02146	0.52263	0.33635	0.33429	0.32936	0.31283	0.06672	0.00699
15	10	0.1	0.4	0.51779	0.01379	0.46843	0.36813	0.25966	0.37221	0.24587	0.04936	0.00408
15	10	0.3	0.2	0.50285	0.00855	0.48861	0.4026	0.19459	0.40281	0.18604	0.01424	0.00021
15	10	0.5	0	0.49782	0.00899	0.49319	0.40727	0.18441	0.40832	0.17542	0.00463	0.00105
15	10	0.7	0.2	0.48644	0.00929	0.50427	0.40301	0.19353	0.40347	0.18424	0.01783	0.00046
15	10	0.9	0.4	0.46649	0.01474	0.51877	0.37176	0.26055	0.36769	0.24581	0.05228	0.00407
15	15	0.1	0.4	0.51507	0.01222	0.47271	0.38592	0.22584	0.38824	0.21362	0.04236	0.00232
15	15	0.3	0.2	0.50073	0.00765	0.49163	0.41347	0.17142	0.41511	0.16377	0.0091	0.00164
15	15	0.5	0	0.49788	0.00731	0.49481	0.41741	0.16416	0.41843	0.15685	0.00307	0.00102
15	15	0.7	0.2	0.49083	0.00701	0.50215	0.41477	0.17063	0.4146	0.16362	0.01132	0.00017
15	15	0.9	0.4	0.47349	0.01179	0.51473	0.38836	0.22547	0.38617	0.21368	0.04124	0.00219
15	20	0.1	0.4	0.51188	0.01061	0.47751	0.39495	0.20668	0.39837	0.19607	0.03437	0.00342
15	20	0.3	0.2	0.5034	0.00644	0.49016	0.42186	0.15626	0.42188	0.14982	0.01324	2E-05
15	20	0.5	0	0.49731	0.00658	0.49611	0.42428	0.15083	0.42489	0.14425	0.0012	0.00061
15	20	0.7	0.2	0.48963	0.00687	0.50349	0.42109	0.15799	0.42093	0.15112	0.01386	0.00016
15	20	0.9	0.4	0.47728	0.00995	0.51277	0.39864	0.20537	0.39599	0.19542	0.03549	0.00265
15	25	0.1	0.4	0.51226	0.00915	0.47859	0.40301	0.19087	0.40612	0.18172	0.03367	0.00311
15	25	0.3	0.2	0.50201	0.00605	0.49195	0.42573	0.14737	0.42689	0.14132	0.01006	0.00116
15	25	0.5	0	0.49532	0.00547	0.49921	0.42973	0.14076	0.42951	0.13529	0.00389	0.00022
15	25	0.7	0.2	0.49209	0.00623	0.50168	0.42621	0.14743	0.42637	0.1412	0.00959	0.00016
15	25	0.9	0.4	0.47865	0.01007	0.51127	0.40475	0.19019	0.40505	0.18012	0.03262	0.0003
20	5	0.1	0.4	0.52192	0.02004	0.45805	0.36252	0.27706	0.36042	0.25702	0.06387	0.0021
20	5	0.3	0.2	0.50621	0.01079	0.48301	0.40626	0.18442	0.40933	0.17363	0.0232	0.00307
20	5	0.5	0	0.49604	0.00855	0.49541	0.41605	0.16748	0.41648	0.15893	0.00063	0.00043
20	5	0.7	0.2	0.48405	0.00977	0.50619	0.4091	0.1821	0.40881	0.17233	0.02214	0.00029
20	5	0.9	0.4	0.45732	0.01937	0.52332	0.36101	0.27562	0.36337	0.25625	0.066	0.00236
20	10	0.1	0.4	0.51947	0.01157	0.46897	0.40097	0.19588	0.40316	0.18431	0.0505	0.00219
20	10	0.3	0.2	0.5059	0.00749	0.48662	0.43425	0.13102	0.43474	0.12353	0.01928	0.00049
20	10	0.5	0	0.49781	0.0063	0.49589	0.44112	0.11809	0.4408	0.11179	0.00192	0.00032
20	10	0.7	0.2	0.48879	0.00729	0.50393	0.43508	0.13067	0.43426	0.12338	0.01514	0.00082
20	10	0.9	0.4	0.47072	0.01037	0.51892	0.40201	0.19784	0.40016	0.18747	0.0482	0.00185
20	15	0.1	0.4	0.51605	0.00799	0.47597	0.4179	0.16303	0.41908	0.15504	0.04008	0.00118
20	15	0.3	0.2	0.50344	0.006	0.49057	0.4452	0.10924	0.44557	0.10324	0.01287	0.00037
20	15	0.5	0	0.49699	0.00531	0.49771	0.45026	0.09894	0.45081	0.09363	0.00072	0.00055
20	15	0.7	0.2	0.49015	0.00531	0.50455	0.44637	0.10898	0.44465	0.10367	0.0144	0.00172
20	15	0.9	0.4	0.4768	0.00757	0.51564	0.41974	0.16188	0.41839	0.15431	0.03884	0.00135
20	20	0.1	0.4	0.514	0.00799	0.47801	0.42792	0.1423	0.42979	0.13431	0.03599	0.00187
20	20	0.3	0.2	0.50309	0.0052	0.49172	0.45355	0.0935	0.45296	0.0883	0.01137	0.00059
20	20	0.5	0	0.49728	0.00472	0.49801	0.45686	0.08605	0.4571	0.08133	0.00073	0.00024
20	20	0.7	0.2	0.4927	0.00546	0.50185	0.45381	0.09301	0.45318	0.08755	0.00915	0.00063
20	20	0.9	0.4	0.47808	0.00721	0.51472	0.42925	0.14298	0.42778	0.13577	0.03664	0.00147
20	25	0.1	0.4	0.51306	0.00677	0.48017	0.43554	0.12822	0.43625	0.12145	0.03289	0.00071
20	25	0.3	0.2	0.50324	0.00419	0.49258	0.45763	0.08445	0.45793	0.08026	0.01066	0.0003
20	25	0.5	0	0.49905	0.0043	0.49665	0.46132	0.07726	0.46143	0.07296	0.0024	0.00011
20	25	0.7	0.2	0.49184	0.00411	0.50406	0.45767	0.08446	0.45788	0.08035	0.01222	0.00021
20	25	0.9	0.4	0.48148	0.00713	0.5114	0.43654	0.12769	0.43578	0.12056	0.02992	0.00076

S-score tail difference (3-point Likert scale)



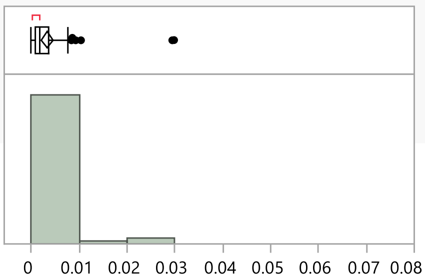
Quantiles

100.0%	maximum	0.07764
99.5%		0.07764
97.5%		0.077055
90.0%		0.06643
75.0%	quartile	0.05199
50.0%	median	0.02252
25.0%	quartile	0.01383
10.0%		0.001612
2.5%		0.001061
0.5%		0.00044
0.0%	minimum	0.00044

Summary Statistics

Mean	0.0315223
Std Dev	0.0236419
N	75
Median	0.02252
Interquartile Range	0.03816

M-score tail difference (3-point Likert scale)



Quantiles

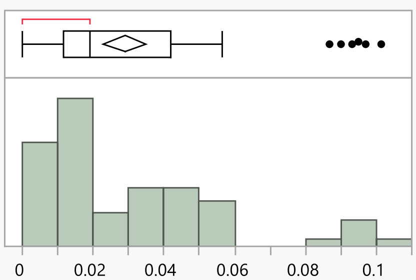
100.0%	maximum	0.02984
99.5%		0.02984
97.5%		0.029507
90.0%		0.0072
75.0%	quartile	0.00352
50.0%	median	0.0018
25.0%	quartile	0.00073
10.0%		0.000408
2.5%		0.000114
0.5%		0.00006
0.0%	minimum	0.00006

Summary Statistics

Mean	0.003276
Std Dev	0.0050076
N	75
Median	0.0018
Interquartile Range	0.00279

Figure 14. Difference Between Tail Values for S-score and M-score for 3-point Likert Scale

S-score tail difference (4-point Likert scale)



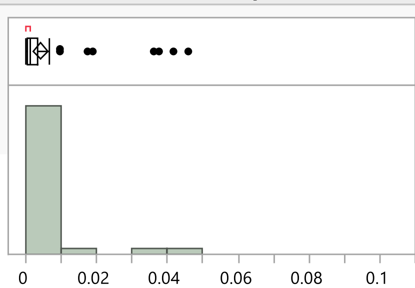
Quantiles

100.0%	maximum	0.10137
99.5%		0.10137
97.5%		0.09741
90.0%		0.056312
75.0%	quartile	0.04172
50.0%	median	0.01916
25.0%	quartile	0.01177
10.0%		0.000766
2.5%		0.000189
0.5%		0.00018
0.0%	minimum	0.00018

Summary Statistics

Mean	0.028884
Std Dev	0.0259496
N	75
Median	0.01916
Interquartile Range	0.02995

M-score tail difference (4-point Likert scale)



Quantiles

100.0%	maximum	0.04587
99.5%		0.04587
97.5%		0.042099
90.0%		0.00961
75.0%	quartile	0.00321
50.0%	median	0.00135
25.0%	quartile	0.00046
10.0%		0.000192
2.5%		0.000037
0.5%		0.00001
0.0%	minimum	0.00001

Summary Statistics

Mean	0.0042581
Std Dev	0.0092622
N	75
Median	0.00135
Interquartile Range	0.00275

Figure 15. Difference Between Tail Values for S-score and M-score for 4-point Likert Scale

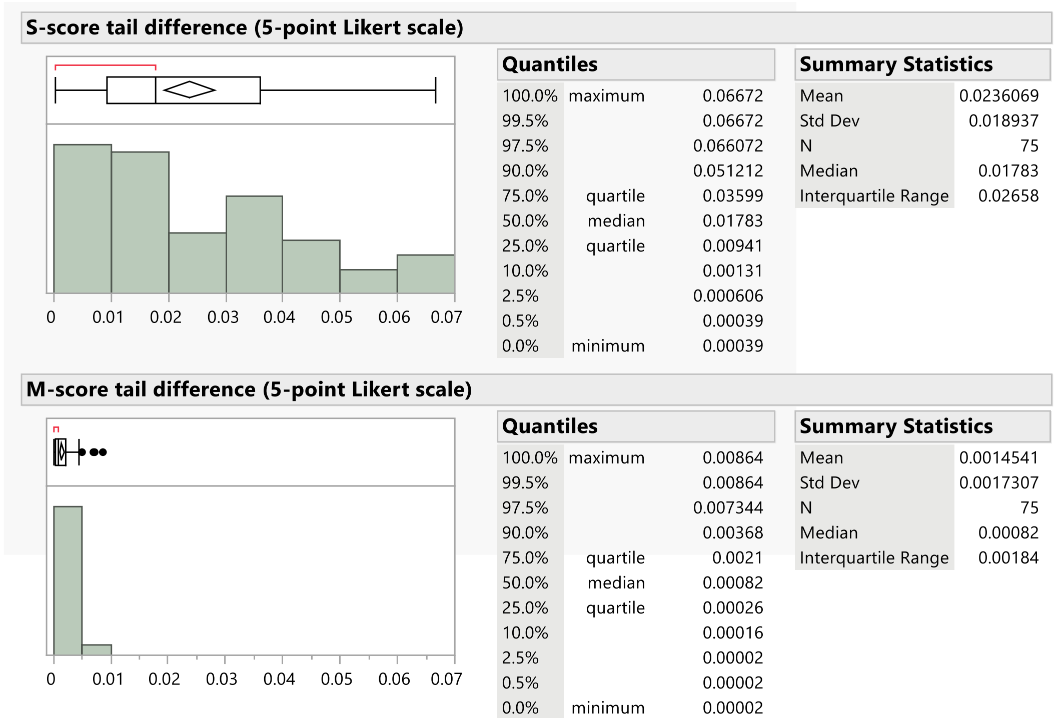


Figure 16. Difference Between Tail Values for S-score and M-score for 5-point Likert Scale

Figures 14-16 show the percentage differences between the tails, that is the absolute value of the difference between the percentage of scores above and below the center value, which is the mean for S-scores and median for M-scores, for Likert scales of 3, 4, and 5. For M-scores, the difference is very close to 0, while S-scores the difference is more variable. This indicates that S-scores are more impacted by skewness.

Table 14 summarizes the outliers present in Figures 14-16 for the percentage difference between the tail groups in the S-score and M-score. A checkmark under S-score or M-score (Table 14) indicates what combination of Likert scale, units, criteria, and skewness level resulted in an outlier for the percentage difference between the tail groups of the distribution. For the M-score, there are a total of 18 outliers: six from the 3-point Likert scale, eight from the 4-point Likert scale, and four from the 5-point Likert scale. For the S-score, there are a total of six outliers, all of which are outliers for the M-score from the 4-point Likert scale as well. It appears that the overall pattern for outliers is the result of the extreme ends of skewness levels, 0.1 and 0.9, followed by lower numbers of criteria. The M-score tail difference have more outliers than the S-score since the majority of the values are 0 and even the slightest variation above 0 gets flagged as different.

Table 14. Outliers for M-score and S-score Tail Differences

Outliers	S-score	M-score	Likert scale	Units	Criteria	Skewness Level	S-score tail difference	M-score tail difference
1		✓	3	10	10	0.1	0.064	0.009
2		✓	3	15	5	0.1	0.073	0.009
3		✓	3	15	10	0.9	0.068	0.010
4		✓	3	15	15	0.9	0.053	0.008
5		✓	3	20	5	0.1	0.077	0.030
6		✓	3	20	5	0.9	0.078	0.029
7	✓	✓	4	10	5	0.1	0.090	0.019
8	✓	✓	4	10	5	0.9	0.087	0.017
9	✓	✓	4	15	5	0.1	0.093	0.038
10	✓	✓	4	15	5	0.9	0.095	0.036
11	✓	✓	4	20	5	0.1	0.097	0.042
12	✓	✓	4	20	5	0.9	0.101	0.046
13		✓	4	15	10	0.1	0.056	0.010
14		✓	4	15	10	0.9	0.056	0.010
15		✓	5	10	5	0.1	0.063	0.009
16		✓	5	10	5	0.9	0.058	0.007
17		✓	5	15	5	0.1	0.063	0.005
18		✓	5	15	5	0.9	0.067	0.007

To further investigate what factors can best explain the S-score tail difference, we conduct a regression analysis. We create a multiple linear model using the fit model function in in JMP Pro 15. We set the S-score tail difference as the response variable and add Likert scale, organizational units, criteria, and distance from the center as input variables into the model. The parameter estimates of the model (Table 15) indicate that units, which has a *p-value* of 0.2573, is not significant compared to α of 0.05. We remove the insignificant variable and rerun the model (Table 16). The standardized betas for each parameter are then ordered (in magnitude) to show the descending level of significance (Table 17).

Table 15. Parameter Estimates for S-score Tail Difference

Term	Estimate	Std Error	t Ratio	Prob>|t|	Std Beta
Intercept	0.0250337	0.003999	6.26	<.0001 *	0
Likert scale	-0.003958	0.000726	-5.45	<.0001 *	-0.13983
Units	0.0001648	0.000145	1.14	0.2573	0.029113
Criteria	-0.00103	8.378e-5	-12.30	<.0001 *	-0.31526
Distance from center	0.1324358	0.003958	33.46	<.0001 *	0.857691

Table 16. Parameter Estimates for S-score Tail Difference (Rerun)

Term	Estimate	Std Error	t Ratio	Prob>|t|	Std Beta
Intercept	0.0275057	0.003357	8.19	<.0001 *	0
Likert scale	-0.003958	0.000726	-5.45	<.0001 *	-0.13983
Criteria	-0.00103	8.384e-5	-12.29	<.0001 *	-0.31526
Distance from center	0.1324358	0.003961	33.44	<.0001 *	0.857691

Table 17. Parameter Estimates for S-score Tail Difference (Sorted Standardized Beta)

Term	Estimate	Std Error	t Ratio	Prob>|t|	Std Beta
Intercept	0.0275057	0.003357	8.19	<.0001	0
Distance from center	0.1324358	0.003961	33.44	<.0001	0.857691
Criteria	-0.00103	8.38E-05	-12.29	<.0001	-0.31526
Likert scale	-0.003958	0.000726	-5.45	<.0001	-0.13983

Typically, the parameter estimate shows the effect on the response for every one unit increase in an input. However, since we will not observe a one-unit increase for the input distance from center, we divide the estimate by 10. In other words, for every 0.1-point increase in distance from center, the S-score tail difference will increase by 1.32%. To ensure we do not extrapolate from the bounds of our explanatory variable, our interpretation is limited to values of 0 to 0.4 for distance from center. For a 0 distance from the center or skewness levels of 0.5, the S-score tail difference will not change. For a 0.2 distance from the center or skewness levels of 0.3 and 0.7, the S-score tail difference will increase by 2.64%. For a 0.4 distance from the center or skewness levels of 0.1 and 0.9, the S-score tail difference will increase by 5.28%. These percentages can be interpreted as risk misclassifications. We discuss this in Chapter 5.

Next, we interpret the parameter estimate for criteria, which has a range of five to 25 in increments of five in our analysis. For every 1-point increase for the criteria, the S-score tail difference will decrease by 0.1%. We multiply this value by five to match our data. The S-score tail difference will decrease by 0.5% for 10 criteria, 1% for 15 criteria, 1.5% for 20 criteria, and 2% for 25 criteria.

Finally, we interpret the parameter estimate for Likert scale, which has a range of 3 to 5 in our analysis. For every 1-point increase for the input Likert scale, the S-score tail difference will decrease by 0.4%. The S-score tail difference will decrease by 0.4% for a 4-point Likert scale and 0.8% for a 5-point Likert scale.

In summary, as the number of criteria and Likert scale value increases, the S-score tail difference decreases; and as the data dominance disperses from the center toward the upper or lower bounds of the distribution, the S-score tail difference increases. As shown in Figure 17, the standardized beta values reveal that the distance from the center of the distribution has 2.7 times more impact on the S-score tail difference than criteria, which has 2.3 times more impact than Likert scale.

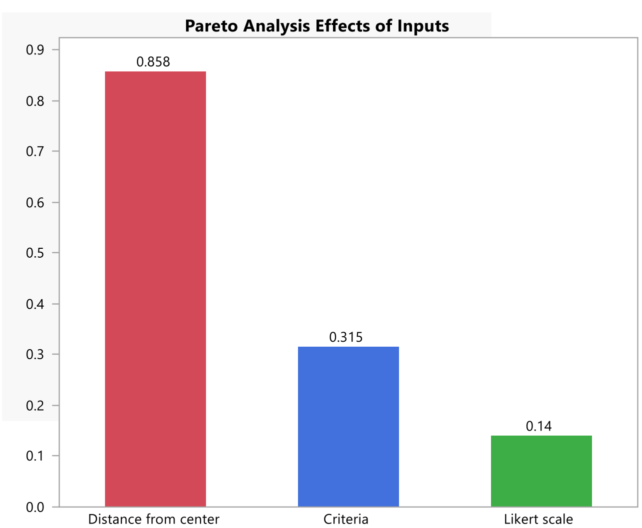
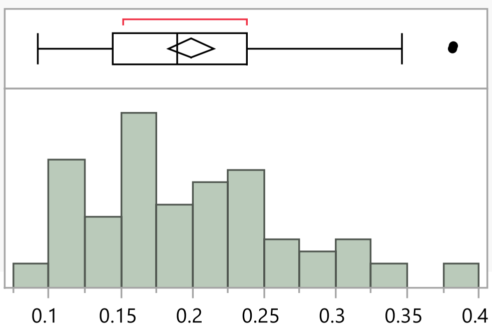


Figure 17. Pareto Analysis Effects of Inputs on S-score Tail Difference

Next, we examine the differences between data central dominance for the S-score and M-score. On average, the M-score has 20% more data central dominance on a 3-point scale, 17% more data central dominance on a 4-point scale, and 15% more data central dominance on a 5-point scale as shown in Figures 18-20. This indicates that M-score, which uses the median, does a better job classifying data in a middle group than an S-score, which uses the mean. Coincidentally, the two outliers in Figures 18-20 representing the 3-, 4-, and 5-point Likert scales are for the combinations of 15 units, 5 criteria, and 0.1 and 0.9 skewness level. With a lower number of criteria, there is more variability and randomness.

Difference between median and mean (3-point Likert scale)



Quantiles

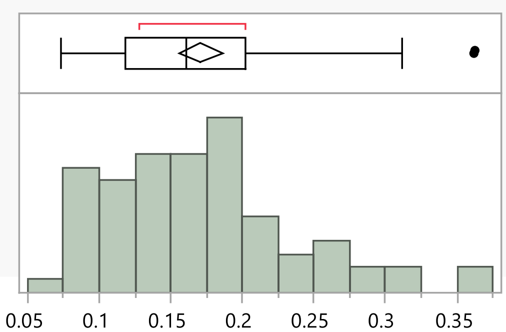
100.0%	maximum	0.38218
99.5%		0.38218
97.5%		0.38164
90.0%		0.310758
75.0%	quartile	0.23769
50.0%	median	0.18899
25.0%	quartile	0.14401
10.0%		0.111074
2.5%		0.0991
0.5%		0.09244
0.0%	minimum	0.09244

Summary Statistics

Mean	0.1991112
Std Dev	0.0701725
N	75
Median	0.18899
Interquartile Range	0.09368

Figure 18. Difference Between Median and Mean for 3-point Likert Scale

Difference between median and mean (4-point Likert scale)



Quantiles

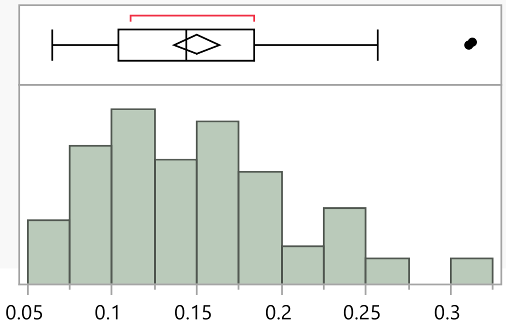
100.0%	maximum	0.36241
99.5%		0.36241
97.5%		0.361789
90.0%		0.269608
75.0%	quartile	0.20184
50.0%	median	0.16105
25.0%	quartile	0.1188
10.0%		0.092916
2.5%		0.080224
0.5%		0.07369
0.0%	minimum	0.07369

Summary Statistics

Mean	0.1706203
Std Dev	0.0659364
N	75
Median	0.16105
Interquartile Range	0.08304

Figure 19. Difference Between Median and Mean for 4-point Likert Scale

Difference between median and mean (5-point Likert scale)



Quantiles

100.0%	maximum	0.31283
99.5%		0.31283
97.5%		0.310958
90.0%		0.235864
75.0%	quartile	0.18424
50.0%	median	0.14397
25.0%	quartile	0.10367
10.0%		0.080314
2.5%		0.069906
0.5%		0.06447
0.0%	minimum	0.06447

Summary Statistics

Mean	0.1503153
Std Dev	0.0577816
N	75
Median	0.14397
Interquartile Range	0.08057

Figure 20. Difference Between Median and Mean for 5-point Likert Scale

Dichotomous Variable

We investigate whether changing the values used to represent a dichotomous variable would change its percent contribution to the response variable. We discover that the values selected to represent the dichotomous variable does skew the response variable. When trying to force a dichotomous variable into a Likert scale as both wings reviewed have done, intuitively the highest and lowest scores are used to represent the responses "yes" and "no." Unbeknownst to those who have never questioned such an approach, choosing the highest and lowest scores could end up giving that criterion a higher weight for the decision process. Through simulation, we realize that the values of the dichotomous numbers do not matter – what matters is the range between the values. For example, using the values of 1 and 5 to represent a dichotomous variable is the same as using the values of 2 and 6 as the range for both are the same (four).

Based on actual data, the 129th RQW and 163rd ATKW both use approximately 23% dichotomous responses when conducting their evaluation. Hence, we use this percentage to approximate the number of criteria theoretically would be dichotomous variables using our five chosen criteria values. For a five-criteria evaluation, one criterion (20%) can be dichotomous. For a 10-criteria evaluation, up to two can be dichotomous (20%). For a 15-criteria evaluation, up to four (26.7%) can be dichotomous. For a 20-criteria evaluation, up to five (25%) can be dichotomous. For a 25-criteria evaluation, up to six (24%) can be dichotomous.

For a 5-point Likert scale, the maximum range between values is four since possible values are between 1 and 5. For a 4-point Likert scale, the maximum range between values is three. For a 3-point Likert scale, the maximum range between values is two. With this information, we calculate the actual percent contribution of each dichotomous variable and compare it with the ideal theoretical percent contribution. The range of the dichotomous variable that has the closest percent contribution to the theoretical value is the recommended range to use if we want each criterion to approximately contribute equally to the response. The detailed metrics for determining the optimal range of a dichotomous variable shown in Table 18 also reveal that the greater the range between the dichotomous variables, the greater its contribution to the response.

Table 18. Determining Optimal Range for a Dichotomous Variable by Likert Scale

Criteria	Number	Percentage	Ideal	Range	Contribution (5 pt)	Contribution (4 pt)	Contribution (3 pt)
5	1	0.200	0.200	1	0.030	0.048	0.086
5	1	0.200	0.200	2	0.111	0.167	0.273
5	1	0.200	0.200	3	0.220	0.310	*
5	1	0.200	0.200	4	0.333	*	*
10	1	0.100	0.100	1	0.014	0.022	0.040
10	1	0.100	0.100	2	0.053	0.082	0.143
10	1	0.100	0.100	3	0.111	0.167	*
10	1	0.100	0.100	4	0.182	*	*
10	2	0.200	0.100	1	0.015	0.024	0.043
10	2	0.200	0.100	2	0.056	0.083	0.136
10	2	0.200	0.100	3	0.110	0.155	*
10	2	0.200	0.100	4	0.167	*	*
15	1	0.067	0.067	1	0.009	0.014	0.026
15	1	0.067	0.067	2	0.034	0.054	0.097
15	1	0.067	0.067	3	0.074	0.114	*
15	1	0.067	0.067	4	0.125	*	*
15	2	0.133	0.067	1	0.009	0.015	0.027
15	2	0.133	0.067	2	0.036	0.055	0.094
15	2	0.133	0.067	3	0.074	0.108	*
15	2	0.133	0.067	4	0.118	*	*
15	3	0.200	0.067	1	0.010	0.016	0.029
15	3	0.200	0.067	2	0.037	0.056	0.091
15	3	0.200	0.067	3	0.073	0.103	*
15	3	0.200	0.067	4	0.111	*	*
15	4	0.267	0.067	1	0.011	0.017	0.030
15	4	0.267	0.067	2	0.038	0.056	0.088
15	4	0.267	0.067	3	0.073	0.099	*
15	4	0.267	0.067	4	0.105	*	*
20	1	0.050	0.050	1	0.007	0.010	0.019
20	1	0.050	0.050	2	0.026	0.040	0.073
20	1	0.050	0.050	3	0.056	0.087	*
20	1	0.050	0.050	4	0.095	*	*
20	2	0.100	0.050	1	0.007	0.011	0.020
20	2	0.100	0.050	2	0.026	0.041	0.071
20	2	0.100	0.050	3	0.056	0.083	*
20	2	0.100	0.050	4	0.091	*	*
20	3	0.150	0.050	1	0.007	0.011	0.021
20	3	0.150	0.050	2	0.027	0.041	0.070
20	3	0.150	0.050	3	0.055	0.080	*
20	3	0.150	0.050	4	0.087	*	*
20	4	0.200	0.050	1	0.008	0.012	0.021
20	4	0.200	0.050	2	0.028	0.042	0.068
20	4	0.200	0.050	3	0.055	0.078	*
20	4	0.200	0.050	4	0.083	*	*
20	5	0.250	0.050	1	0.008	0.013	0.022
20	5	0.250	0.050	2	0.029	0.042	0.067
20	5	0.250	0.050	3	0.055	0.075	*
20	5	0.250	0.050	4	0.080	*	*
25	1	0.040	0.040	1	0.005	0.008	0.015
25	1	0.040	0.040	2	0.020	0.032	0.059
25	1	0.040	0.040	3	0.045	0.070	*
25	1	0.040	0.040	4	0.077	*	*
25	2	0.080	0.040	1	0.005	0.009	0.016
25	2	0.080	0.040	2	0.021	0.033	0.058
25	2	0.080	0.040	3	0.045	0.068	*
25	2	0.080	0.040	4	0.074	*	*
25	3	0.120	0.040	1	0.006	0.009	0.016
25	3	0.120	0.040	2	0.021	0.033	0.057
25	3	0.120	0.040	3	0.044	0.066	*
25	3	0.120	0.040	4	0.071	*	*
25	4	0.160	0.040	1	0.006	0.009	0.017
25	4	0.160	0.040	2	0.022	0.033	0.056
25	4	0.160	0.040	3	0.044	0.064	*
25	4	0.160	0.040	4	0.069	*	*
25	5	0.200	0.040	1	0.006	0.010	0.017
25	5	0.200	0.040	2	0.022	0.033	0.055
25	5	0.200	0.040	3	0.044	0.062	*
25	5	0.200	0.040	4	0.067	*	*
25	6	0.240	0.040	1	0.006	0.010	0.018
25	6	0.240	0.040	2	0.023	0.034	0.054
25	6	0.240	0.040	3	0.044	0.060	*
25	6	0.240	0.040	4	0.065	*	*

Note: An asterisk (*) indicates value is not possible.

Table 19. Optimal Range for a Dichotomous Variable

x-Point Likert Scale	Range	Values to Use
3	2	1 and 3
4	2	1 and 3, or 2 and 4
5	3	1 and 4, or 2 and 5

Table 19 summarizes the results from the analysis performed in Table 18. A dichotomous variable for a 3-point Likert scale should have a range of two using values of 1 and 3. A dichotomous variable for a 4-point Likert scale should have a range of two using values of 1 and 3 or 2 and 4. A dichotomous variable for a 5-point Likert scale should have a range of three using values of 1 and 4 or 2 and 5.While it is quite possible to develop an equation and determine the exact range to use for dichotomous variables, the method would be too complicated to be adopted in the field. The aforementioned simplified method works for determining the values of the dichotomous variable if the interested response is the sum of dichotomous variables and same-scaled Likert variables where it is desirable for all inputs to be of relatively equal weight. Figures 21-23 show the actual contribution for different dichotomous value ranges against its ideal contribution.

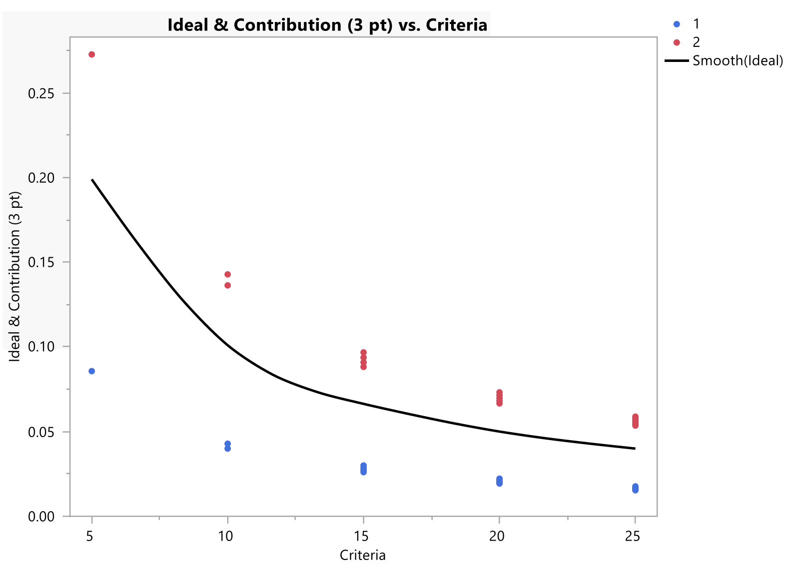


Figure 21. Contribution of Different Dichotomous Value Ranges for 3-pt Likert Scale

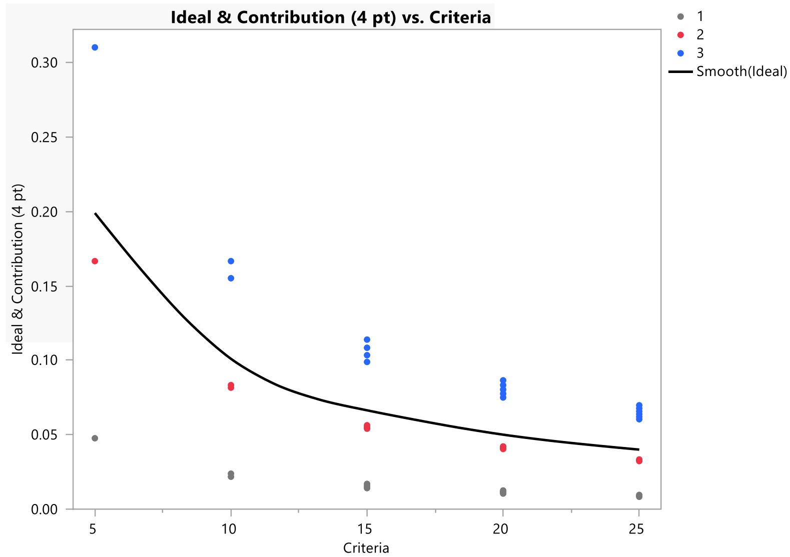


Figure 22. Contribution of Different Dichotomous Value Ranges for 4-pt Likert Scale

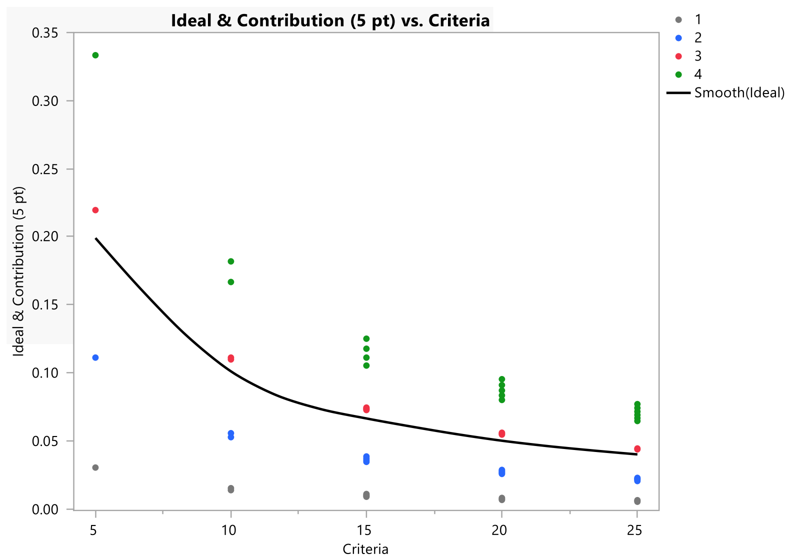


Figure 23. Contribution of Different Dichotomous Value Ranges for 5-pt Likert Scale

Summary

In this chapter, we analyze our data using the S-score, the M-score and compare the results of the two standardized scores centering data about the mean and median, respectively. Using the S-score skews the data dominance in the tails of the distribution and misclassifies data that should be in the center group. The M-score fixes the shortfalls of the S-score. We reveal the values selected to represent the dichotomous variables change its percent contribution to the response. While the values themselves do not matter, the range between the two do. The greater the range between the two values, the greater its contribution to the response. We reveal the optimal range for a dichotomous variable for Likert scales of 3 to 5. Our results reveal that the structure of the two RBSSs from the 129^{th} RQW and 163^{rd} ATKW are haphazard and wings may be unintentionally skewing the decision of inspection prioritization using the existing methods. In the next chapter, we present our conclusions and recommendations.

V. Conclusions and Recommendations

Chapter Overview

In this chapter, we present our conclusions of our research, its significance, recommendations for action and for future research. Our research investigates the viability of an inspection prioritization tool Air Combat Command (ACC) disseminates as an example that meets the intent of a risk-based sampling strategy in compliance with Air Force Instruction 90-201 (2018). A risk-based sampling strategy (RBSS) is a method used to inspect areas deemed most important by commanders requiring an independent assessment by the Inspector General (IG). Currently, individual wings build their own strategy, which may be considerably different as there is no uniform approach across the Air Force. The sponsor for this research, the 23rd Wing, requested that we evaluate the sample tool from the 129th Rescue Wing (RQW) obtained through its major command (MAJCOM), ACC, to see if it is a statistically sound process and recommend improvements as necessary.

Investigative Questions Answered

Our research investigates and examines the validity of the 129th RQW's current RBSS tools as well as its preceding tool from the 163rd Attack Wing, which is also a modified product possibly originating from the 366th Fighter Wing. We primarily focus on the 129th's tool as it is presented to the sponsor as an example of a properly executed RBSS. We identify any problems with the current tools and propose improvements and possible solutions. While it is possible to create a new decision analysis tool, it is easier for users to adopt a process that is familiar, reducing the learning curve. Given that variants of the existing tool have proliferated throughout ACC as an example of an acceptable RBSS, our research focuses on enhancing an existing product, making any necessary adjustments, and ensuring the method employed is statistically sound. Through our analysis, we answer our investigative questions:

1. What are the current processes different inspection teams use for their risk-based sampling strategy?
2. What is the validity of the current risk-based sampling strategies?
3. What may be done to correct or improve the current risk-based sampling strategies?
4. What may be a better tool to use for risk-based sampling strategy?
5. How can we create a product that is simple to use and explain to users?

Conclusions of Research

We determine that the 129th RQW's RBSS tool has potential for improvement. Its current structure identifies evaluation criteria, each with its own scale, and scores all organizational units under its command (wing). These individual criteria scores are summed for each organizational unit and then converted into a standardization metric where its mean and standard deviation are used to categorize units into four different risk groups to determine their inspection priority from highest to lowest risk using the color scheme red, amber, green, and blue, respectively.

Although never explicitly stated, the 129th RQW RBSS process appears to follow the Empirical Rule, which requires data to be normally distributed. However, our simulations suggest that the data does not follow a normal distribution. As such, the mean is influenced by skewness. Yet, the tool uses a standardized score about a mean, which we call an S-score in our analysis. By centering data classification about a mean that is generally not equal to 0, organizational units may be improperly classified as risky or vice versa when in fact they belong in between the two extreme groups. To prevent misclassification in the center, we propose an M-score, which uses a standardized score about a median, equally dividing all organizational units in half.

With an M-score, aside from grouping scores in the upper and lower bounds, we can create a third group for standardized scores equal to the median as it would be inaccurate to force the middle point values into either the upper or lower value groups. In contrast, it is theoretically unlikely for the S-scores to equal the mean, which is an average and typically a fractional value (not a whole number). Not only does the M-score provide a more accurate comparison of organizational performance within a wing, but it also classifies units into three groups: poor, average, and good. By dividing performance into three groups, one can use the intuitive and familiar red, amber, and green traffic light status reporting to highlight organizational units that are the riskiest. Once the initial three groups are identified, wings can repeat the M-score process for the top and bottom groups to further stratify organizational unit performance where the bottom (hottest) of the red group will have top inspection priority and the top (coolest) of the green group could be a potential candidate for a waived vertical inspection.

In its current composition, the 129th RQW RBSS tool mixes and matches Likert scales for criteria ranging from 2 to 5 without consideration for standardization. A 3-point Likert scale is not the same as a 5-point Likert scale. Combining different scales changes its percent contribution to the variable of interest, which is the aggregate of an organizational unit's scores across all criteria. Assuming it is desirable to have each criterion contribute equally to the response variable and the users do not want to perform complicated scaling, the simple fix is to consistently use the same Likert scale.

The tool's defined criteria scale is different than the scores inspectors used in their assessment. While most of the criteria are written to be scored on a 5-point Likert scale, most criteria typically display 3-point Likert responses, which indicates inspectors favor a 3-point Likert scale. This is likely due to the high turnover rate of IG staff positions where one may have breadth and not depth for (or some basic knowledge of) different organizational units across the wing, making it manageable to distinguish among poor, average, and good, but challenging to differentiate between performance beyond that. As such, we recommend a 3-point Likert scale be used as it is simple and again follows the intuitive red, amber, and green traffic light status reporting that leaders are accustomed to seeing and using.

Although some criteria in the RBSS tool have theoretical Likert scales, their presented responses are dichotomous. While we generally do not recommend combining different Likert scales, there are occasions where a valued criteria may only have dichotomous responses as evident in our descriptive analysis. Instead of throwing out a potentially valuable criteria, we consider its impact to the response variable if matched to the same Likert scale other criteria use. Unlike the standard 3-, 4-, and 5-point Likert scales, the range between dichotomous variables are not set when matching a same-point Likert scale.

We investigated whether the values of the dichotomous response mattered if it is desirable for all input variables to have relatively equal contribution to the response variable. We discover that the ranges between the dichotomous values matter more than the values themselves because if two values have the same range, they have the same percent contribution. In addition, the greater the range between the dichotomous variables, the greater its contribution to the response. While it is mathematically feasible to determine a fractional value for the optimal range of a dichotomous variable, a complicated method will unlikely be employed in the field. To simplify the approach, we approximate the optimal range of a dichotomous variable, which depends on the Likert scale used. For a 3-point and 4-point Likert scale, the optimal range for the dichotomous values is two. For a 5-point Likert scale, the optimal range is three.

Significance of Research

The Air Force does not have a standardized approach for creating an RBSS, using the current best attempt as the gold standard without consideration for statistical soundness of the process. Through descriptive and inferential statistical analysis, we define rules that can help Air Force wings build a simple intuitive model that meets the intent of an RBSS without being overly cumbersome and complicated. We recognize that organizational unit performance may not be normally distributed, which makes it difficult to standardize scores about a mean without data dominance classification errors and propose standardizing scores about a median, allowing the tails of distributions to have roughly equal percentages of data dominance, and a more prominent central dominance group. The approach of using a median instead of a mean is a simple adjustment that can be performed using the current tool of choice, an Excel spreadsheet.

While wings may have a defined scale to use for their evaluation, our analysis reveals that most criteria assessments have three responses, resembling a 3-point Likert scale and indicating a mismatch between theoretical and actual scales. Instead of imposing a scale that will not be used in practice, we recommend using a 3-point Likert scale as most people can differentiate between poor, average, and good.

While no research indicates what values should be chosen to represent a dichotomous variable, we found that the percent contribution increases as the range between the two chosen values increases. For roughly equal contribution, we should use the values 1 and 3 to represent dichotomous variables for 3- and 4-point Likert scales and the values 1 and 4 to represent dichotomous variables for 5-point Likert scales.

Recommendations for Action

We recommend using one Likert scale throughout the RBSS to maintain the integrity of equal contribution to the response variable. Based on our findings, we recommend using a 3-point Likert scale. If dichotomous variables are used in conjunction with a chosen Likert scale, the range of the two dichotomous values matter – the greater the range, the greater its contribution. For simplicity, use a range of two (or values of 1 and 3) for 3- and 4-point Likert scales; use a range of three (or values of 1 and 4) for 5-point Likert scales. When comparing the sum of criteria scores among organizational units to determine risk groups, we recommend standardizing about a median and using an M-score to categorize into three risk groups.

Recommendations for Future Research

Our research focuses on improving an existing MAJCOM-approved RBSS tool by examining data dominance patterns. We reasonably assume that all criteria are independent in our analysis, but perhaps additional analysis can be performed for criteria that have correlation. We assume that the user prefers each criterion to contribute equally to the response variable and did not consider changing the weighting factor of some criteria that may be deemed more important to the decision process. While we do discuss using a combination of a 3-point Likert scale and dichotomous variables in our research, our analysis does not consider mixing and matching different Likert scales within the same RBSS tool. We examine data for primarily two organizations, the 129th RQW and 163rd ATKW. While both fall under ACC, neither are active-duty units. Other MAJCOMs and active-duty units may have a different approach to their RBSS and their approved RBSSs can potentially be evaluated and compared to the ones in our analysis. Additionally, we focus on enhancing the univariate model used by the 129th RQW as it is the one

ACC provided and do not further evaluate the more complicated bivariate model used by the 163rd ATKW, which could potentially be further researched.

Summary

In conclusion, we recommend that wings use an M-score to standardize about a median so that data dominance in the tail groups would be relatively equal and there would be a more prominent central dominance group. This allows wings to categorize organizational units into three groups: good (green), average (amber), and poor (red). Following this same principle, we recommend that wings consistently use a 3-point Likert scale to evaluate their selected criteria in their RBSS as we find it is the most used scale. If combining a dichotomous variable with a 3-point Likert scale, the optimal range between the two variables is two so we should use the values 1 and 3, assuming it is desirable for all criteria to contribute approximately equally to the sum of criteria scores.

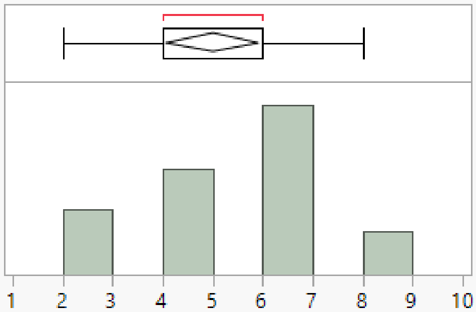
Appendix A. 129th Rescue Wing Risk-Based Sampling Strategy

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	IGI Member:		Taute		Taute	Johnston	Johnston	Tatekawa	Morgan	Taute	Taute	Taute	Johnston	Johnston	Taute	Blancas	Blancas	
2	low number = inspect/higher vis high number = no inspect/lower vis **Green** = recommended by 90-201 Blue = complete		Gonkulator gonkulated on:	30-Dec-19					[illegible] numbers (dec & feb) improved:5 same:4 increased red numbers:3									
3	**Criteria**		**Wing CC Priority** (weighted order of magnitude x 2)		Readiness Reporting	QA Stan/Eval Reports	Photo Album Reports (Functional assessments, SAVs, AARS, meeting mins, etc.)	IMR	Individual Trning Records	Amn/IGI Personal Obs	USAP Findings (WAR, CIMB, USAP Tracker, MICT)	Climate Surveys	Continual Eval Results	Safety Reports	**QIWG**/GIGC/SAIC/CII/SII/HHQ Concerns for the last year	Monthly End Strength	Non-deployable monthly roster from FSF	~~PT Test Passing Percentages~~
4	**Scaling Criteria**		1=very high priority 2= 3= 4= 5= very low priority	(column C x 2)	1=very low readiness 2=low readiness 3=neutral readiness 4=high readiness 5=very high readiness	1=unfavorable reports 2=no reports 3=neutral reports 4=favorable reports	1= very unfavorable reports 2=unfavorable reports 3=neutral/no reports 4=favorable reports 5=very favorable reports	1=80% & below 2=80-90% 3=90% & above	ARCNet report "AFSC Training" red (past due/non-compliant)	1= very unfavorable obs 2=unfavorable obs 3=neutral obs 4=favorable obs 5=very favorable obs	1= very unfavorable obs 2=unfavorable obs 3=neutral/no obs 4=favorable obs 5=very favorable obs	1=improvement needed 2=caution 3=no survey 4=adequate 5=excellent	1=high risk 2=no CE 3=medium risk 4= 5=low risk	1= very unfavorable 2=unfavorable 3=neutral/none 4=favorable 5=very favorable	1=3 or more trend(s)/note(s) exist 2=1-2 trend(s)/note(s) exist 3=no trend(s)/note(s) exist		1= very unfavorable 2=unfavorable 3=neutral/none 4=favorable 5=very favorable	~~percentage~~
5	**Units**																	
6	WS	[redacted]			DATA MASKED													Not a priority for CCIP per Wing/CC
7	OG Staff (OGV)	[redacted]																
8	OSS	[redacted]																
9	129 RQS	[redacted]																
10	130 RQS	[redacted]																
11	131 RQS	[redacted]																
12	MXG Staff	[redacted]																
13	AMXS	[redacted]																
14	MXS	[redacted]																
15	MOF	[redacted]																
16	MSG Staff	[redacted]																
17	LRS	[redacted]																
18	SFS	[redacted]																
19	CF	[redacted]																
20	CEF	[redacted]																
21	FSF	[redacted]																
22	MDG	[redacted]																
23	CPTF	[redacted]																

	A	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO
1	IGI Member:	Blancas	Morgan	Trujillo	Mann	Taute	Taute	Morgan	Taute								Taute							
2	low number = inspect/higher vis high number = no inspect/lower vis **Green** = recommended by 90-201 Blue = complete								MICT Open Obs	MICT Critical Obs	MICT T-0 Obs	MICT T-1 Obs	MICT T-2 Obs	MICT # of overdue SAC assessments/validation	MICT # of overdue obs Suspense dates	MICT # of missing CAPs for Obs	IGEMS # of overdue closure suspense dates	IGEMS # of overdue CAP suspense dates	IGEMS # of overdue CAP ECDs	IGEMS # of Crit deficiencies	IGEMS # of Sig deficiencies			
3	**Criteria**	Performance Reports/ACAs timeliness	ARCNet ESR Training Report Currency (CBRNE & SABC)	Waivers	Time Since Last Inspection (CCIP/UEI)	Commander/Program Mgr off station > 4 months or DSG	Crit & Sig Inspection Deficiencies from 106 RQW & 144 FW for the last 2 years	MICT Compliance	IGI MICT Metrics Assessment including quality of responses								IGI IGEMS Metrics Assessment							
4	**Scaling Criteria**	1= very unfavorable 2=unfavorable 3=neutral/none 4=favorable 5=very favorable	**NA for this period due to inadequate accoutability**	1=no waivers 3=waiver(s)	1= > 2 years 2= 1yr < time < 2 yrs 3= 6 mo < time < 1 yr 4= < 6 mo	1=yes to above 5=no to above	1=many deficiencies 2=less deficiencies 3=little to no deficiencies	percentage: 95-100%=5 90-94=4	1= very unfavorable metrics 2=unfavorable metrics 3=neutral / NO metrics 4=favorable metrics 5=very favorable metrics								1= very unfavorable metrics 2=unfavorable metrics 3=neutral / NO metrics 4=favorable metrics 5=very favorable metrics							
5	**Units**																					**SUM**	**RISK**	
6	WS																					0	Highest Risk	
7	OG Staff (OGV)																					0	Highest Risk	
8	OSS																					0	Highest Risk	
9	129 RQS																					0	Highest Risk	Mean=
10	130 RQS																					0	Highest Risk	Std Dev=
11	131 RQS																					0	Highest Risk	
12	MXG Staff																					0	Highest Risk	Highest Risk
13	AMXS																					0	Highest Risk	Higher Risk
14	MXS																					0	Highest Risk	Mean =
15	MOF																					0	Highest Risk	Less Risk
16	MSG Staff																					0	Highest Risk	Least Risk
17	LRS																					0	Highest Risk	
18	SFS																					0	Highest Risk	
19	CF																					0	Highest Risk	
20	CEF																					0	Highest Risk	
21	FSF																					0	Highest Risk	
22	MDG																					0	Highest Risk	
23	CPTF																					0	Highest Risk	

Appendix B. 129th Rescue Wing Risk-Based Sampling Strategy Criteria Statistics

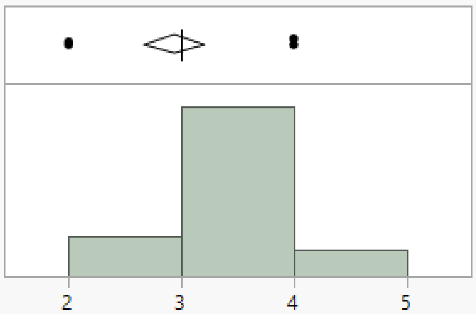
Wing Commander Priority



Summary Statistics

Mean	5
Std Dev	1.8470963
N	18
Median	6
Interquartile Range	2

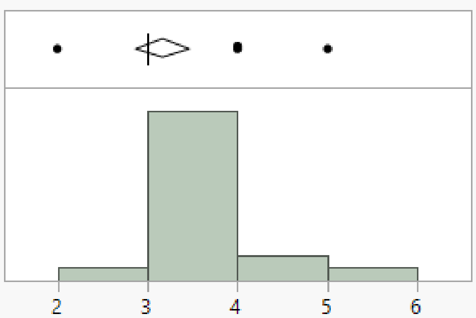
Quality Assurance Standardization Evaluation Reports



Summary Statistics

Mean	2.9444444
Std Dev	0.5393048
N	18
Median	3
Interquartile Range	0

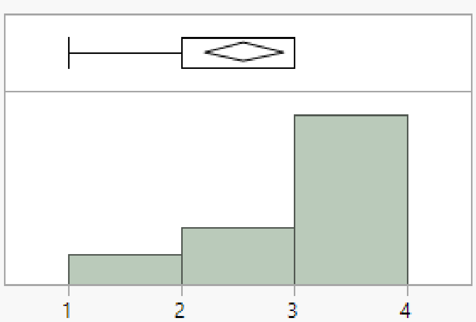
Photo Album Reports



Summary Statistics

Mean	3.1666667
Std Dev	0.6183469
N	18
Median	3
Interquartile Range	0

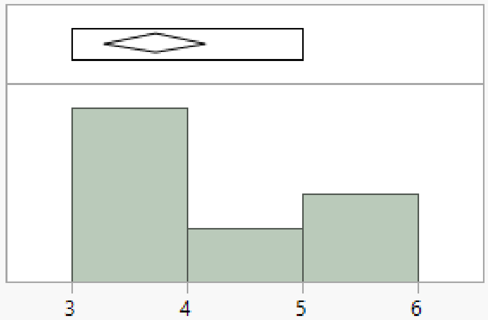
Individual Medical Readiness



Summary Statistics

Mean	2.5555556
Std Dev	0.7047922
N	18
Median	3
Interquartile Range	1

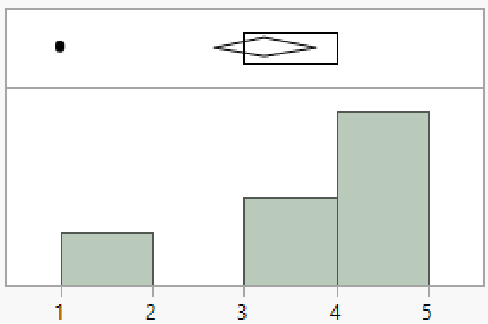
Individual Training Records



Summary Statistics

Mean	3.7222222
Std Dev	0.8947925
N	18
Median	3
Interquartile Range	2

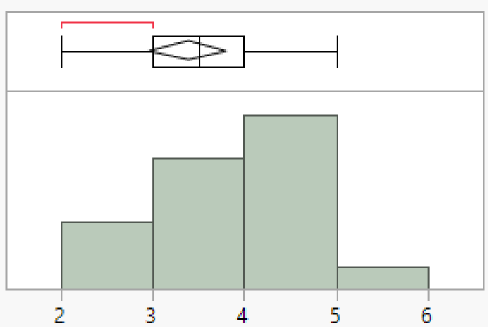
Airman/Inspections Directorate Personal Observations



Summary Statistics

Mean	3.2222222
Std Dev	1.1143743
N	18
Median	4
Interquartile Range	1

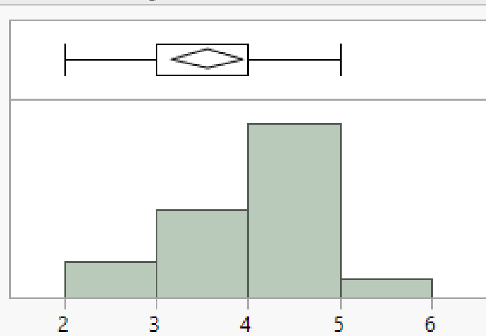
Unit Self-Assessment Program Findings



Summary Statistics

Mean	3.3888889
Std Dev	0.8498366
N	18
Median	3.5
Interquartile Range	1

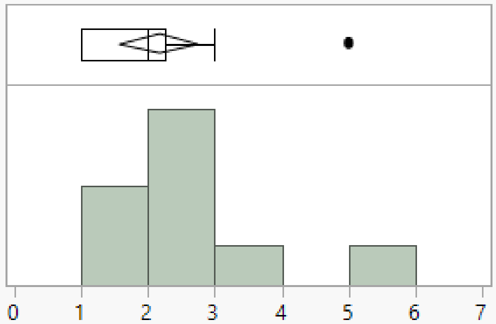
Climate Surveys



Summary Statistics

Mean	3.5555556
Std Dev	0.7838234
N	18
Median	4
Interquartile Range	1

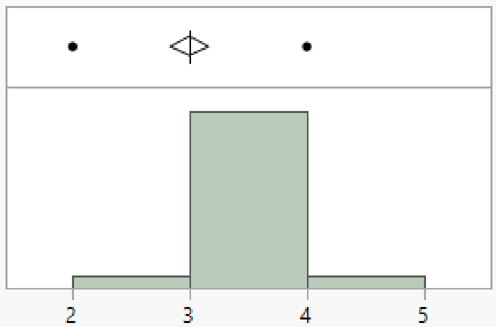
Continuous Evaluation Results



Summary Statistics

Mean	2.1666667
Std Dev	1.2004901
N	18
Median	2
Interquartile Range	1.25

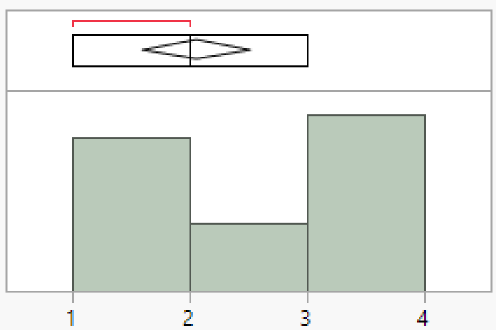
Safety Reports



Summary Statistics

Mean	3
Std Dev	0.3429972
N	18
Median	3
Interquartile Range	0

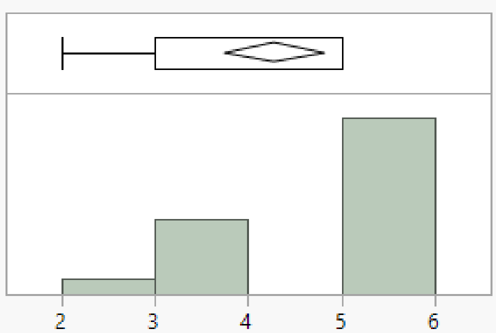
QIWG, GIGC, SAIC, CII, SII, HHQ, Concerns for last year



Summary Statistics

Mean	2.0555556
Std Dev	0.9375953
N	18
Median	2
Interquartile Range	2

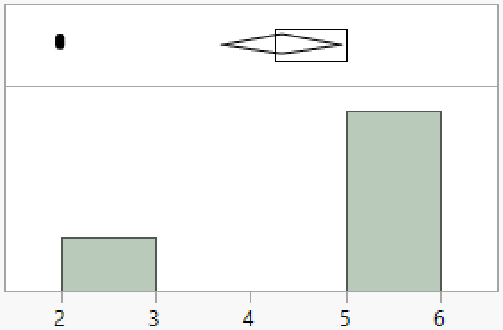
Monthly End Strength



Summary Statistics

Mean	4.2777778
Std Dev	1.0740553
N	18
Median	5
Interquartile Range	2

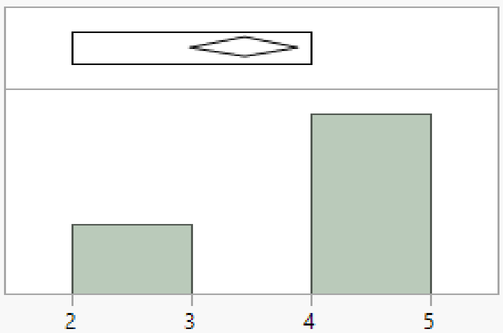
Non-deployable monthly roster



Summary Statistics

Mean	4.3333333
Std Dev	1.2833779
N	18
Median	5
Interquartile Range	0.75

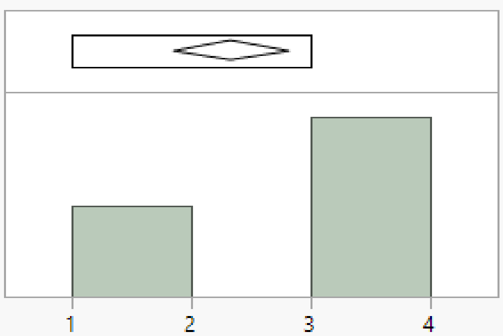
Performance reports/Airman Comprehensive Assessment Timelines



Summary Statistics

Mean	3.4444444
Std Dev	0.9217772
N	18
Median	4
Interquartile Range	2

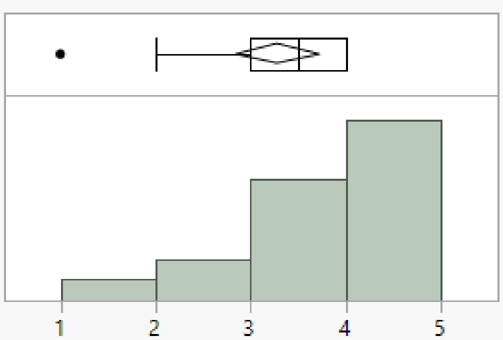
Waivers



Summary Statistics

Mean	2.3333333
Std Dev	0.9701425
N	18
Median	3
Interquartile Range	2

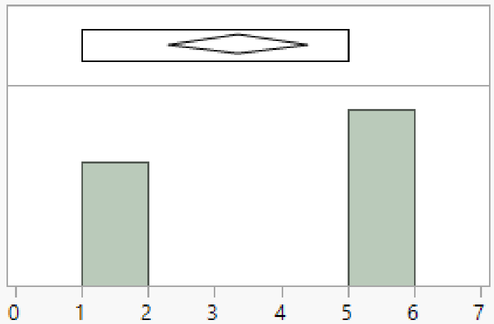
Time Since Last Inspection (CCIP/UEI)



Summary Statistics

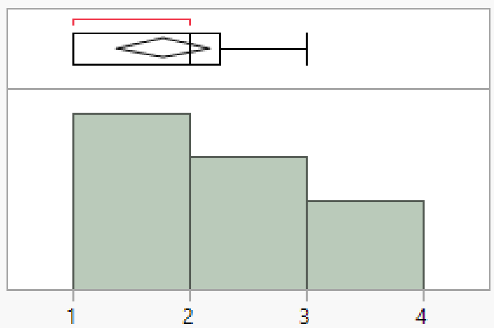
Mean	3.2777778
Std Dev	0.8947925
N	18
Median	3.5
Interquartile Range	1

CC/PM Off Station > 4 months



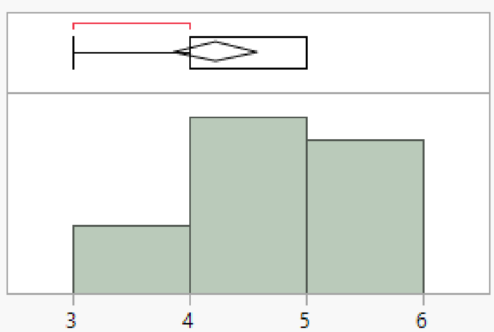
Summary Statistics	
Mean	3.3529412
Std Dev	2.0291986
N	17
Median	5
Interquartile Range	4

Crit/Sig Inspection Deficiencies from 106RQW/ 144FW for last 2 years



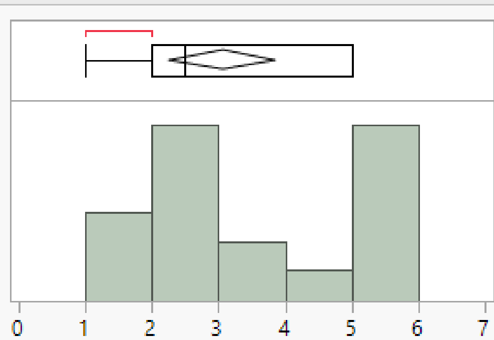
Summary Statistics	
Mean	1.7777778
Std Dev	0.8084521
N	18
Median	2
Interquartile Range	1.25

MICT Compliance



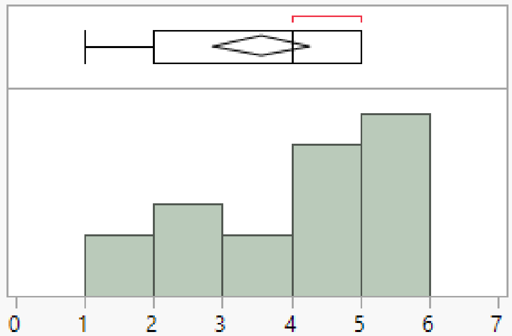
Summary Statistics	
Mean	4.2222222
Std Dev	0.7320845
N	18
Median	4
Interquartile Range	1

IGI MICT Metrics Assessment



Summary Statistics	
Mean	3.0555556
Std Dev	1.5893847
N	18
Median	2.5
Interquartile Range	3

Inspections Directorate IG Evaluation

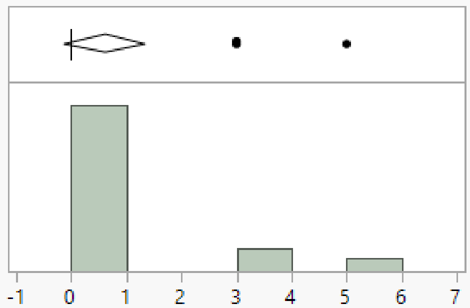


Summary Statistics

Mean	3.5555556
Std Dev	1.4234268
N	18
Median	4
Interquartile Range	3

Appendix C. 163rd Attack Wing Risk-Based Sampling Strategy Criteria Statistics

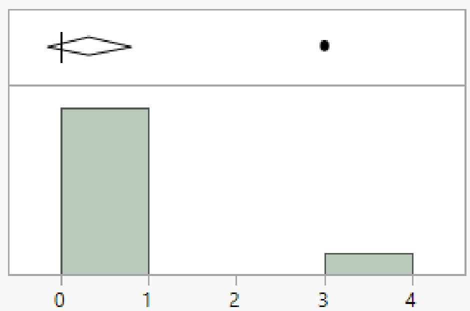
MICT (Unit) Root Cause Data



Summary Statistics

Mean	0.6111111
Std Dev	1.4608172
N	18
Median	0
Interquartile Range	0

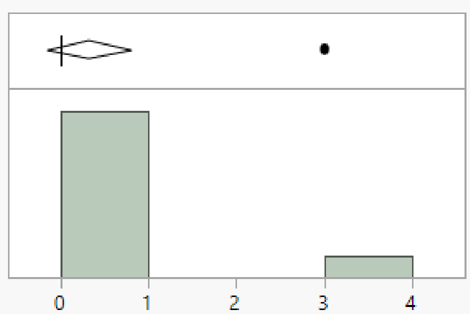
MICT Open Obs over 180/365 Days



Summary Statistics

Mean	0.3333333
Std Dev	0.9701425
N	18
Median	0
Interquartile Range	0

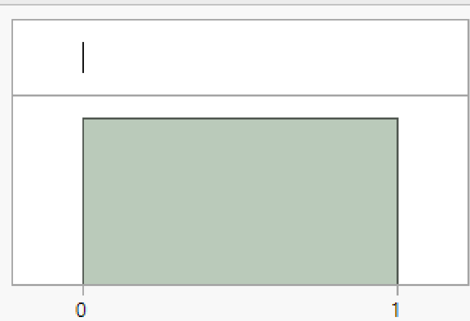
Waivers Assigned to Unit



Summary Statistics

Mean	0.3333333
Std Dev	0.9701425
N	18
Median	0
Interquartile Range	0

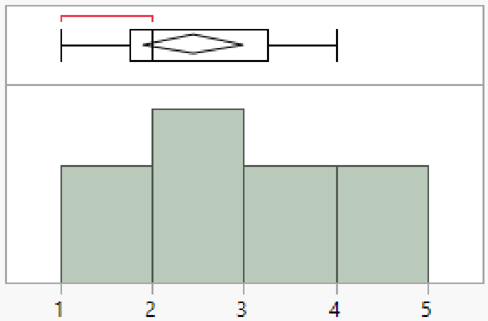
Does the Unit Track Observations/Issues to Closure Outside of MICT?



Summary Statistics

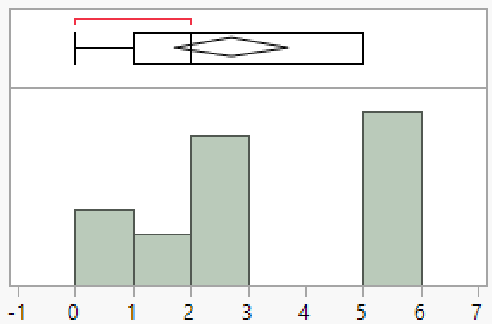
Mean	0
Std Dev	0
N	18
Median	0
Interquartile Range	0

Personnel in Excessive Training (over 36 months) or awaiting training school (over 6 months)



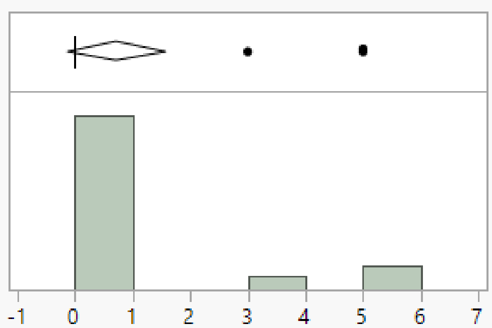
Summary Statistics	
Mean	2.4444444
Std Dev	1.0966378
N	18
Median	2
Interquartile Range	1.5

Time lapse since last vertical inspection



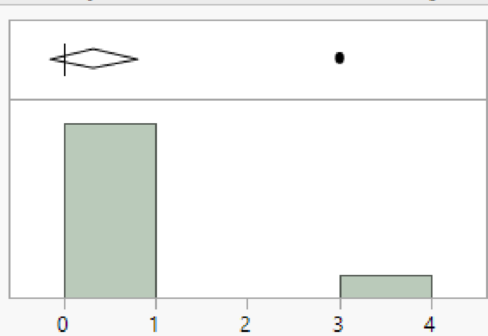
Summary Statistics	
Mean	2.7222222
Std Dev	1.9942728
N	18
Median	2
Interquartile Range	4

IGEMS (Wing) Root Cause Data



Summary Statistics	
Mean	0.7222222
Std Dev	1.7083034
N	18
Median	0
Interquartile Range	0

IGEMS Open Deficiencies over 180 Days



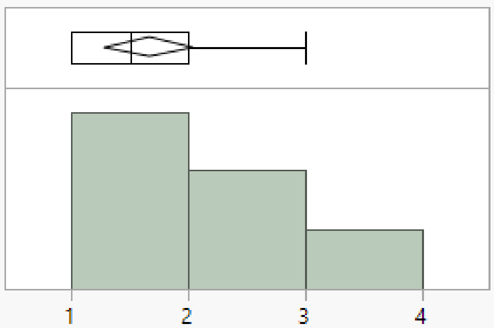
Summary Statistics	
Mean	0.3333333
Std Dev	0.9701425
N	18
Median	0
Interquartile Range	0

Repeat Writeups

Summary Statistics

Mean	0
Std Dev	0
N	18
Median	0
Interquartile Range	0

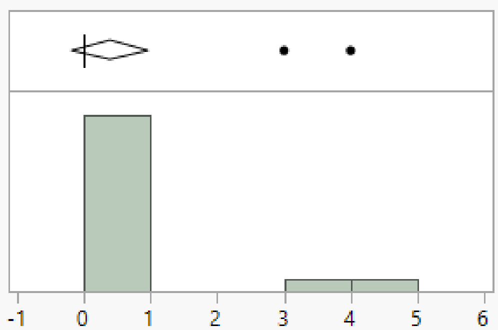
Unit Health (DEOCS/Inspection Findings)



Summary Statistics

Mean	1.6666667
Std Dev	0.766965
N	18
Median	1.5
Interquartile Range	1

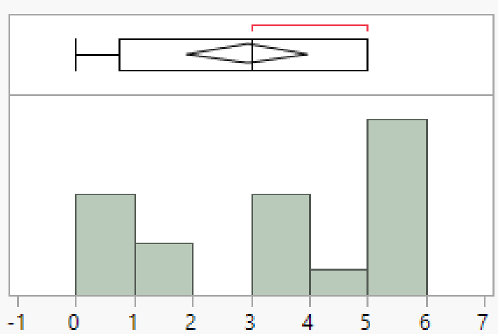
USAP/AARs



Summary Statistics

Mean	0.3888889
Std Dev	1.1447522
N	18
Median	0
Interquartile Range	0

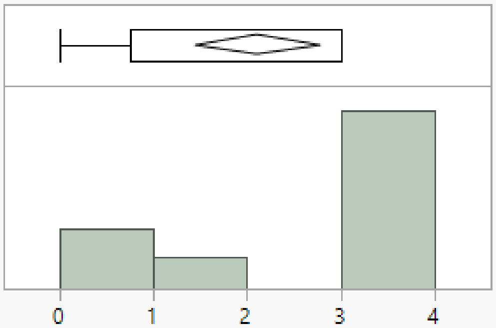
Time Lapse since last external assessment (UAV/SAV)



Summary Statistics

Mean	2.9444444
Std Dev	2.0714366
N	18
Median	3
Interquartile Range	4.25

Continual Evaluation



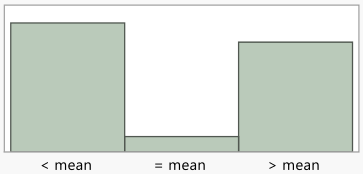
Summary Statistics

Mean	2.1111111
Std Dev	1.3234931
N	18
Median	3
Interquartile Range	2.25

Appendix D. Simulation Graphs for Different Combinations of Likert Scale, Criteria, Skewness Level and Units

Distributions - Likert Scale=3, Units=10, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

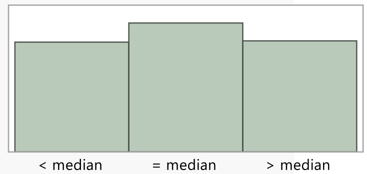


Frequencies

Level	Count	Prob
< mean	50820	0.50830
= mean	5750	0.05751
> mean	43410	0.43419
Total	99980	1.00000

N Missing 20
3 Levels

Data dominance (M-score)



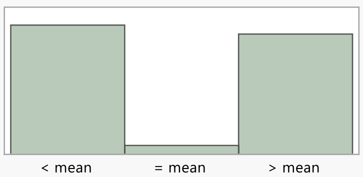
Frequencies

Level	Count	Prob
< median	31329	0.31335
= median	36969	0.36976
> median	31682	0.31688
Total	99980	1.00000

N Missing 20
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

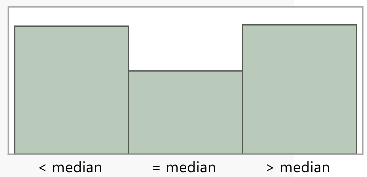


Frequencies

Level	Count	Prob
< mean	50201	0.50201
= mean	2907	0.02907
> mean	46892	0.46892
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



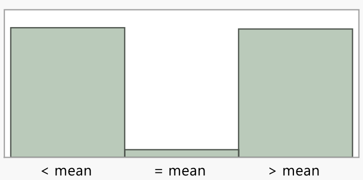
Frequencies

Level	Count	Prob
< median	37618	0.37618
= median	24277	0.24277
> median	38105	0.38105
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

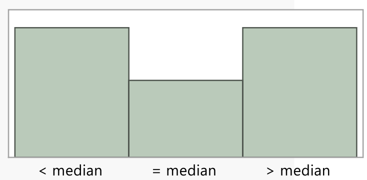


Frequencies

Level	Count	Prob
< mean	48859	0.48859
= mean	2538	0.02538
> mean	48603	0.48603
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



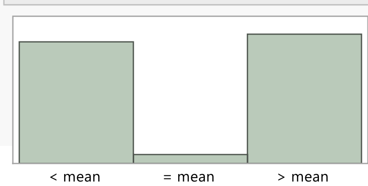
Frequencies

Level	Count	Prob
< median	38471	0.38471
= median	22927	0.22927
> median	38602	0.38602
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

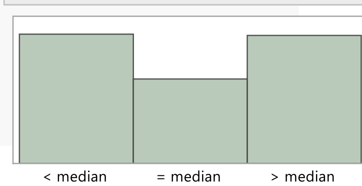


Frequencies

Level	Count	Prob
< mean	47089	0.47089
= mean	3047	0.03047
> mean	49864	0.49864
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



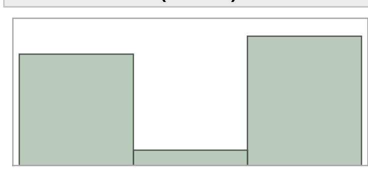
Frequencies

Level	Count	Prob
< median	37874	0.37874
= median	24556	0.24556
> median	37570	0.37570
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

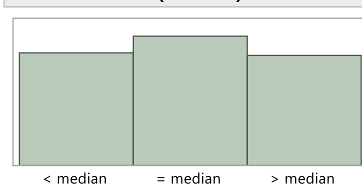


Frequencies

Level	Count	Prob
< mean	43753	0.43757
= mean	5441	0.05442
> mean	50796	0.50801
Total	99990	1.00000

N Missing 10
3 Levels

Data dominance (M-score)



Frequencies

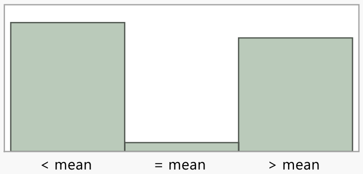
Level	Count	Prob
< median	31904	0.31907
= median	36737	0.36741
> median	31349	0.31352
Total	99990	1.00000

N Missing 10
3 Levels

Note: In the graphs with 10 units, five criteria, and a 3-point Likert scale, there are missing sample sizes or N Missing for skewness levels of 0.1 and 0.9. The standard deviation is 0 for those data points (the simulation generated the exact value), causing the respective S-score and M-score to be undefined. We expect smaller sample sizes to result in more variability and anomalies.

Distributions - Likert Scale=3, Units=10, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

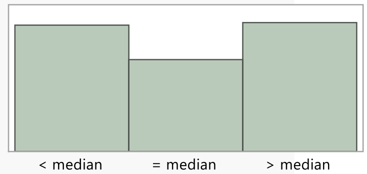


Frequencies

Level	Count	Prob
< mean	51686	0.51686
= mean	2998	0.02998
> mean	45316	0.45316
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



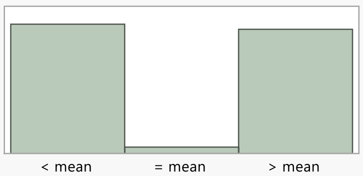
Frequencies

Level	Count	Prob
< median	36262	0.36262
= median	26547	0.26547
> median	37191	0.37191
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

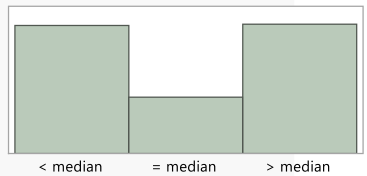


Frequencies

Level	Count	Prob
< mean	50065	0.50065
= mean	2045	0.02045
> mean	47890	0.47890
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



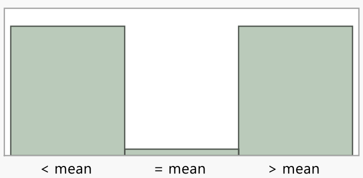
Frequencies

Level	Count	Prob
< median	40932	0.40932
= median	17863	0.17863
> median	41205	0.41205
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

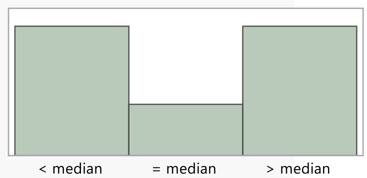


Frequencies

Level	Count	Prob
< mean	48992	0.48992
= mean	1868	0.01868
> mean	49140	0.49140
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



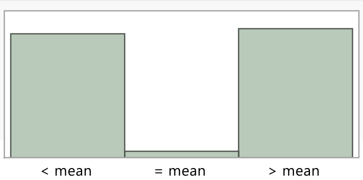
Frequencies

Level	Count	Prob
< median	41892	0.41892
= median	16260	0.16260
> median	41848	0.41848
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

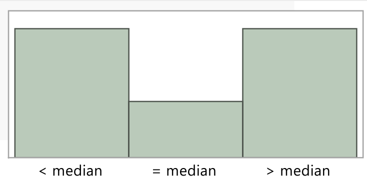


Frequencies

Level	Count	Prob
< mean	47857	0.47857
= mean	2124	0.02124
> mean	50019	0.50019
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



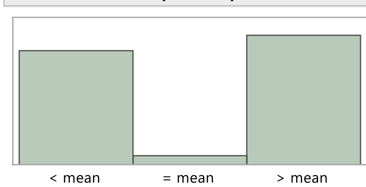
Frequencies

Level	Count	Prob
< median	41135	0.41135
= median	17822	0.17822
> median	41043	0.41043
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

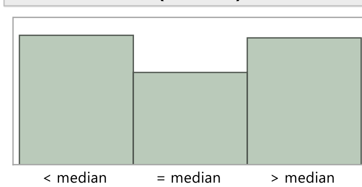


Frequencies

Level	Count	Prob
< mean	45358	0.45358
= mean	3207	0.03207
> mean	51435	0.51435
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



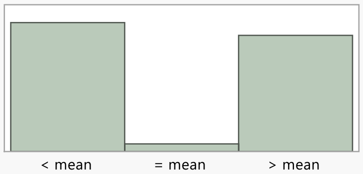
Frequencies

Level	Count	Prob
< median	37190	0.37190
= median	26312	0.26312
> median	36498	0.36498
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

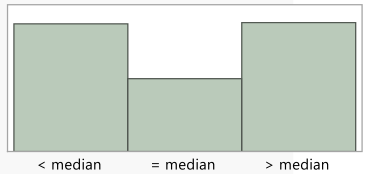


Frequencies

Level	Count	Prob
< mean	51379	0.51379
= mean	2591	0.02591
> mean	46030	0.46030
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



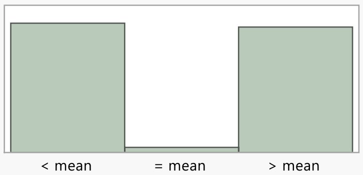
Frequencies

Level	Count	Prob
< median	38733	0.38733
= median	22077	0.22077
> median	39190	0.39190
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

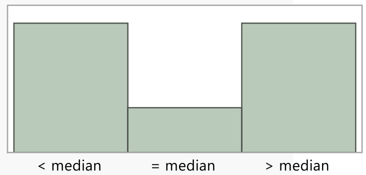


Frequencies

Level	Count	Prob
< mean	50038	0.50038
= mean	1668	0.01668
> mean	48294	0.48294
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



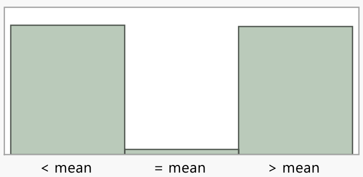
Frequencies

Level	Count	Prob
< median	42769	0.42769
= median	14397	0.14397
> median	42834	0.42834
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

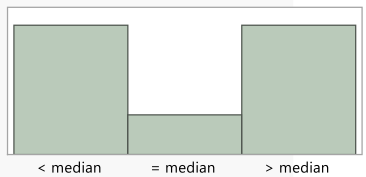


Frequencies

Level	Count	Prob
< mean	49420	0.49420
= mean	1469	0.01469
> mean	49111	0.49111
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



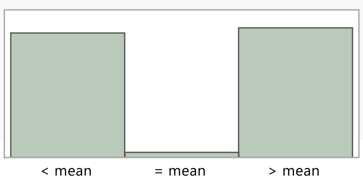
Frequencies

Level	Count	Prob
< median	43365	0.43365
= median	13202	0.13202
> median	43433	0.43433
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

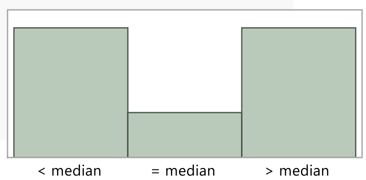


Frequencies

Level	Count	Prob
< mean	48239	0.48239
= mean	1698	0.01698
> mean	50063	0.50063
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



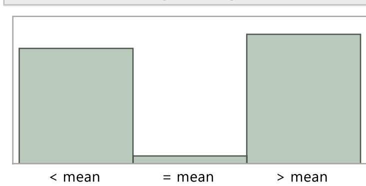
Frequencies

Level	Count	Prob
< median	42761	0.42761
= median	14537	0.14537
> median	42702	0.42702
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

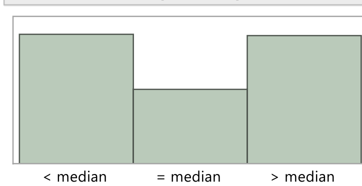


Frequencies

Level	Count	Prob
< mean	46019	0.46019
= mean	2532	0.02532
> mean	51449	0.51449
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



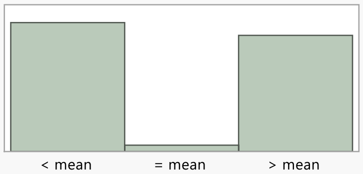
Frequencies

Level	Count	Prob
< median	39092	0.39092
= median	22299	0.22299
> median	38609	0.38609
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

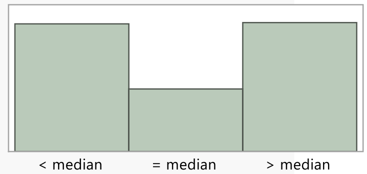


Frequencies

Level	Count	Prob
< mean	51386	0.51386
= mean	2174	0.02174
> mean	46440	0.46440
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



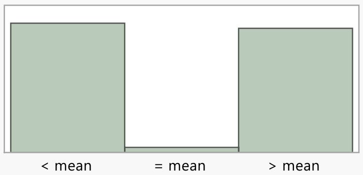
Frequencies

Level	Count	Prob
< median	40072	0.40072
= median	19524	0.19524
> median	40404	0.40404
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

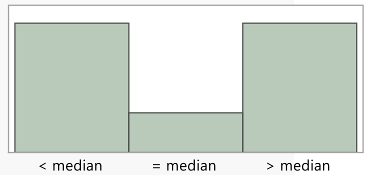


Frequencies

Level	Count	Prob
< mean	50235	0.50235
= mean	1397	0.01397
> mean	48368	0.48368
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



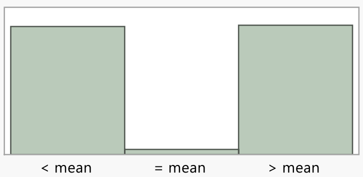
Frequencies

Level	Count	Prob
< median	43528	0.43528
= median	12928	0.12928
> median	43544	0.43544
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

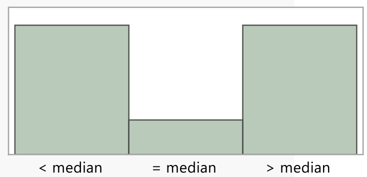


Frequencies

Level	Count	Prob
< mean	49209	0.49209
= mean	1275	0.01275
> mean	49516	0.49516
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



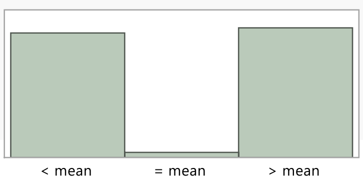
Frequencies

Level	Count	Prob
< median	44176	0.44176
= median	11574	0.11574
> median	44250	0.44250
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

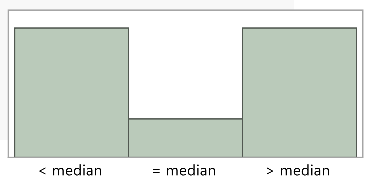


Frequencies

Level	Count	Prob
< mean	48335	0.48335
= mean	1467	0.01467
> mean	50198	0.50198
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



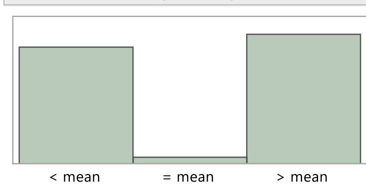
Frequencies

Level	Count	Prob
< median	43710	0.43710
= median	12586	0.12586
> median	43704	0.43704
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

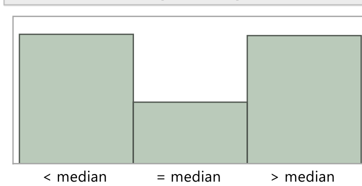


Frequencies

Level	Count	Prob
< mean	46503	0.46503
= mean	2088	0.02088
> mean	51409	0.51409
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



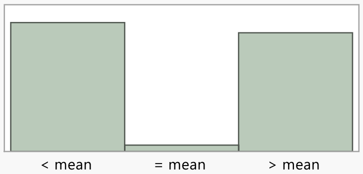
Frequencies

Level	Count	Prob
< median	40605	0.40605
= median	19001	0.19001
> median	40394	0.40394
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

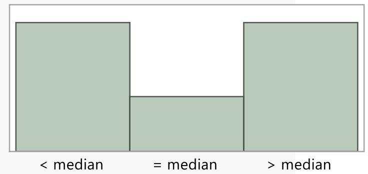


Frequencies

Level	Count	Prob
< mean	51124	0.51124
= mean	2041	0.02041
> mean	46835	0.46835
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



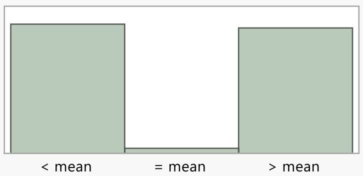
Frequencies

Level	Count	Prob
< median	41254	0.41254
= median	17340	0.17340
> median	41406	0.41406
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

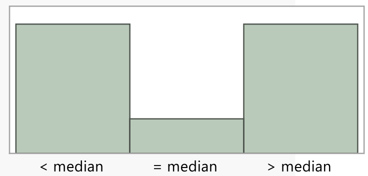


Frequencies

Level	Count	Prob
< mean	50163	0.50163
= mean	1332	0.01332
> mean	48505	0.48505
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



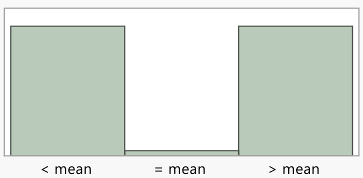
Frequencies

Level	Count	Prob
< median	44327	0.44327
= median	11365	0.11365
> median	44308	0.44308
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

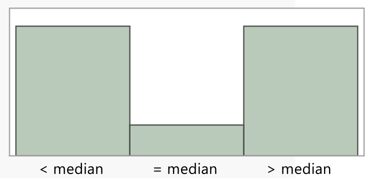


Frequencies

Level	Count	Prob
< mean	49310	0.49310
= mean	1267	0.01267
> mean	49423	0.49423
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



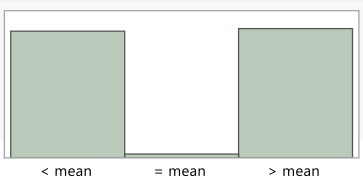
Frequencies

Level	Count	Prob
< median	44738	0.44738
= median	10511	0.10511
> median	44751	0.44751
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

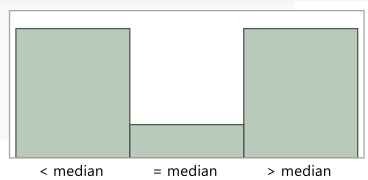


Frequencies

Level	Count	Prob
< mean	48834	0.48834
= mean	1227	0.01227
> mean	49939	0.49939
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



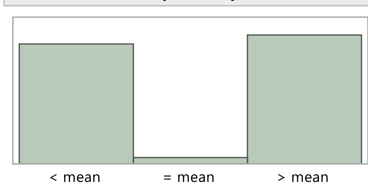
Frequencies

Level	Count	Prob
< median	44363	0.44363
= median	11211	0.11211
> median	44426	0.44426
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=10, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

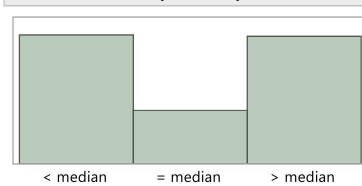


Frequencies

Level	Count	Prob
< mean	47108	0.47108
= mean	1980	0.01980
> mean	50912	0.50912
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



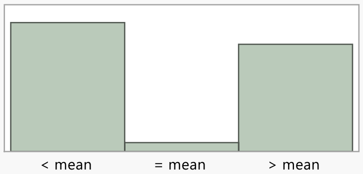
Frequencies

Level	Count	Prob
< median	41549	0.41549
= median	17196	0.17196
> median	41255	0.41255
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

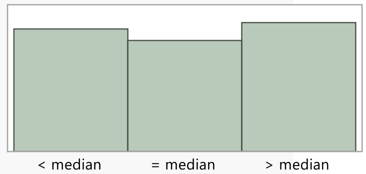


Frequencies

Level	Count	Prob
< mean	53035	0.53035
= mean	2930	0.02930
> mean	44035	0.44035
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



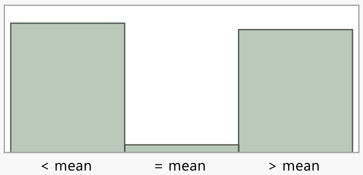
Frequencies

Level	Count	Prob
< median	33718	0.33718
= median	30675	0.30675
> median	35607	0.35607
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

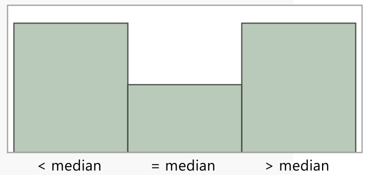


Frequencies

Level	Count	Prob
< mean	49905	0.49905
= mean	2510	0.02510
> mean	47585	0.47585
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



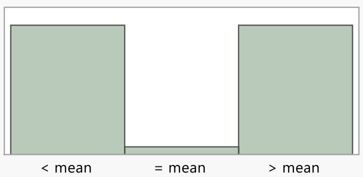
Frequencies

Level	Count	Prob
< median	39641	0.39641
= median	20576	0.20576
> median	39783	0.39783
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

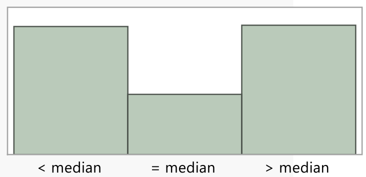


Frequencies

Level	Count	Prob
< mean	48804	0.48804
= mean	2292	0.02292
> mean	48904	0.48904
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



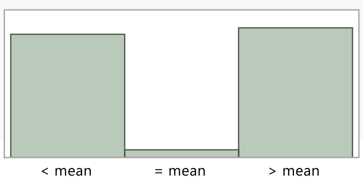
Frequencies

Level	Count	Prob
< median	40469	0.40469
= median	18828	0.18828
> median	40703	0.40703
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

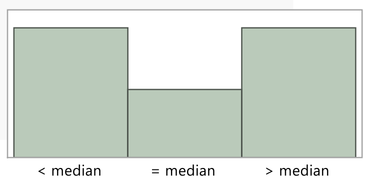


Frequencies

Level	Count	Prob
< mean	47701	0.47701
= mean	2311	0.02311
> mean	49988	0.49988
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



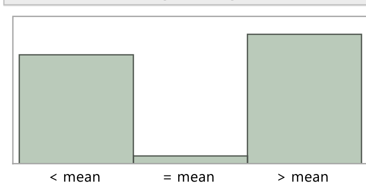
Frequencies

Level	Count	Prob
< median	39684	0.39684
= median	20771	0.20771
> median	39545	0.39545
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

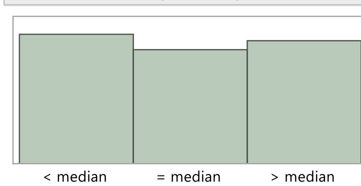


Frequencies

Level	Count	Prob
< mean	44241	0.44241
= mean	2842	0.02842
> mean	52917	0.52917
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



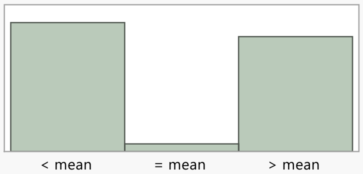
Frequencies

Level	Count	Prob
< median	35305	0.35305
= median	31131	0.31131
> median	33564	0.33564
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

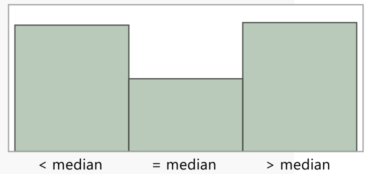


Frequencies

Level	Count	Prob
< mean	51591	0.51591
= mean	2425	0.02425
> mean	45984	0.45984
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



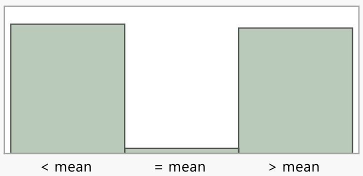
Frequencies

Level	Count	Prob
< median	38609	0.38609
= median	22136	0.22136
> median	39255	0.39255
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

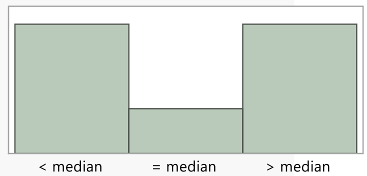


Frequencies

Level	Count	Prob
< mean	49944	0.49944
= mean	1616	0.01616
> mean	48440	0.48440
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



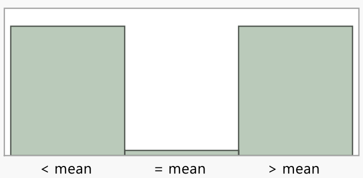
Frequencies

Level	Count	Prob
< median	42728	0.42728
= median	14405	0.14405
> median	42867	0.42867
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

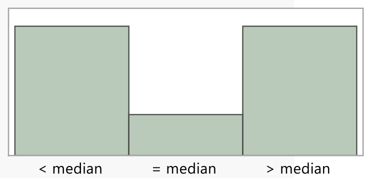


Frequencies

Level	Count	Prob
< mean	49286	0.49286
= mean	1446	0.01446
> mean	49268	0.49268
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



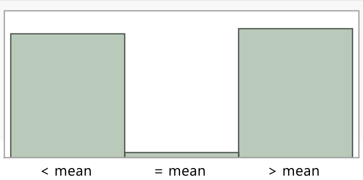
Frequencies

Level	Count	Prob
< median	43311	0.43311
= median	13326	0.13326
> median	43363	0.43363
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

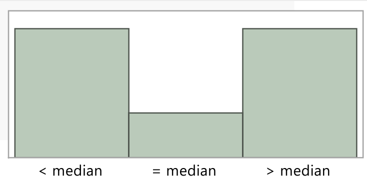


Frequencies

Level	Count	Prob
< mean	48234	0.48234
= mean	1616	0.01616
> mean	50150	0.50150
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



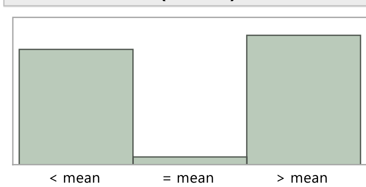
Frequencies

Level	Count	Prob
< median	42694	0.42694
= median	14601	0.14601
> median	42705	0.42705
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

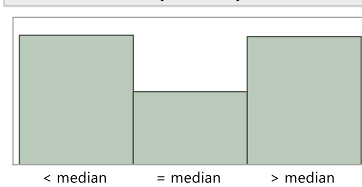


Frequencies

Level	Count	Prob
< mean	45940	0.45940
= mean	2577	0.02577
> mean	51483	0.51483
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



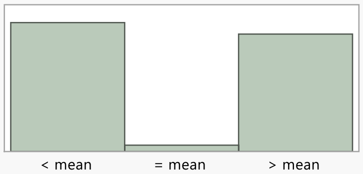
Frequencies

Level	Count	Prob
< median	39284	0.39284
= median	21874	0.21874
> median	38842	0.38842
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

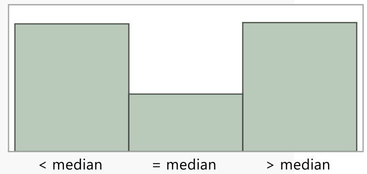


Frequencies

Level	Count	Prob
< mean	51362	0.51362
= mean	2066	0.02066
> mean	46572	0.46572
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



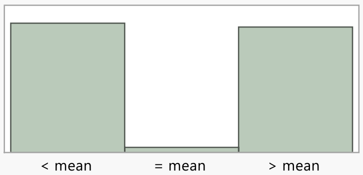
Frequencies

Level	Count	Prob
< median	40794	0.40794
= median	18133	0.18133
> median	41073	0.41073
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

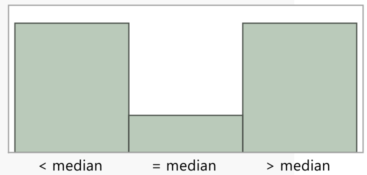


Frequencies

Level	Count	Prob
< mean	50182	0.50182
= mean	1291	0.01291
> mean	48527	0.48527
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



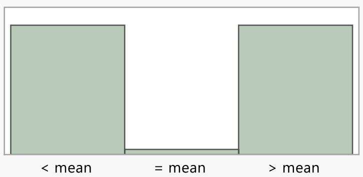
Frequencies

Level	Count	Prob
< median	43858	0.43858
= median	12229	0.12229
> median	43913	0.43913
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

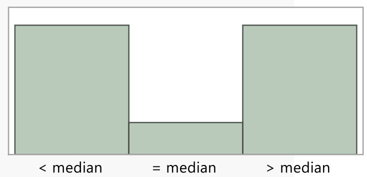


Frequencies

Level	Count	Prob
< mean	49433	0.49433
= mean	1259	0.01259
> mean	49308	0.49308
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



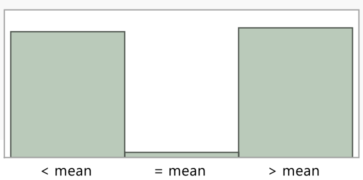
Frequencies

Level	Count	Prob
< median	44648	0.44648
= median	10713	0.10713
> median	44639	0.44639
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

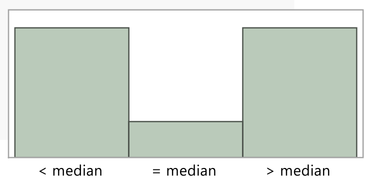


Frequencies

Level	Count	Prob
< mean	48597	0.48597
= mean	1314	0.01314
> mean	50089	0.50089
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



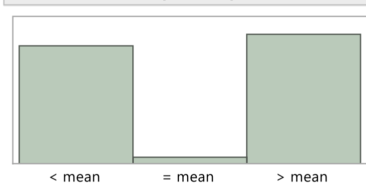
Frequencies

Level	Count	Prob
< median	44166	0.44166
= median	11760	0.11760
> median	44074	0.44074
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

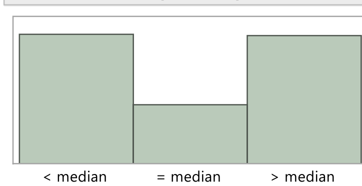


Frequencies

Level	Count	Prob
< mean	46683	0.46683
= mean	2176	0.02176
> mean	51141	0.51141
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



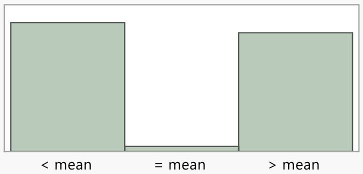
Frequencies

Level	Count	Prob
< median	41054	0.41054
= median	18281	0.18281
> median	40665	0.40665
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

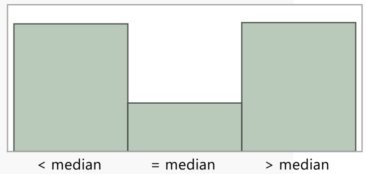


Frequencies

Level	Count	Prob
< mean	51070	0.51070
= mean	1776	0.01776
> mean	47154	0.47154
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



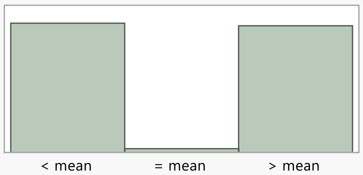
Frequencies

Level	Count	Prob
< median	42049	0.42049
= median	15688	0.15688
> median	42263	0.42263
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

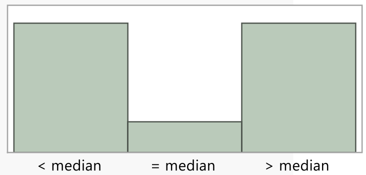


Frequencies

Level	Count	Prob
< mean	50020	0.50020
= mean	1137	0.01137
> mean	48843	0.48843
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



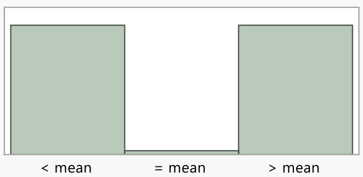
Frequencies

Level	Count	Prob
< median	44837	0.44837
= median	10404	0.10404
> median	44759	0.44759
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

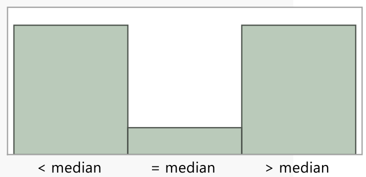


Frequencies

Level	Count	Prob
< mean	49487	0.49487
= mean	1067	0.01067
> mean	49446	0.49446
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



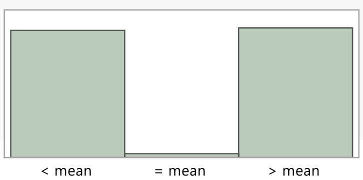
Frequencies

Level	Count	Prob
< median	45382	0.45382
= median	9278	0.09278
> median	45340	0.45340
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

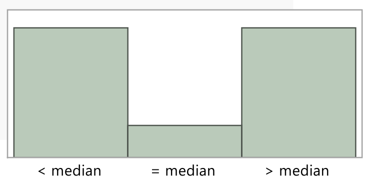


Frequencies

Level	Count	Prob
< mean	48814	0.48814
= mean	1188	0.01188
> mean	49998	0.49998
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



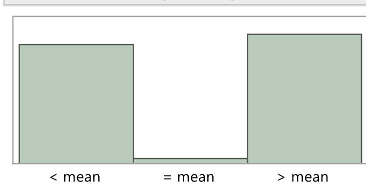
Frequencies

Level	Count	Prob
< median	44742	0.44742
= median	10527	0.10527
> median	44731	0.44731
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

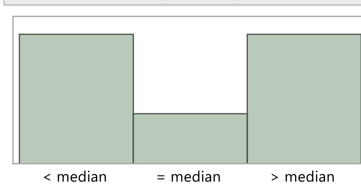


Frequencies

Level	Count	Prob
< mean	47101	0.47101
= mean	1783	0.01783
> mean	51116	0.51116
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



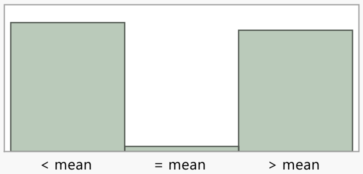
Frequencies

Level	Count	Prob
< median	42095	0.42095
= median	15983	0.15983
> median	41922	0.41922
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

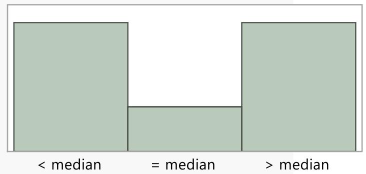


Frequencies

Level	Count	Prob
< mean	50742	0.50742
= mean	1671	0.01671
> mean	47587	0.47587
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



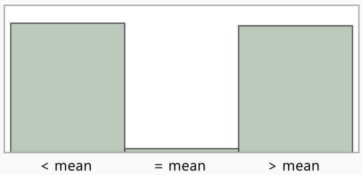
Frequencies

Level	Count	Prob
< median	42713	0.42713
= median	14421	0.14421
> median	42866	0.42866
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

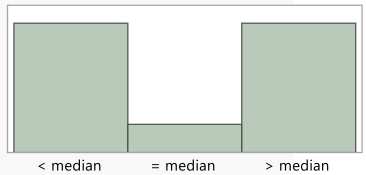


Frequencies

Level	Count	Prob
< mean	50087	0.50087
= mean	1010	0.01010
> mean	48903	0.48903
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



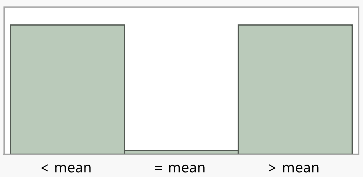
Frequencies

Level	Count	Prob
< median	45312	0.45312
= median	9381	0.09381
> median	45307	0.45307
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

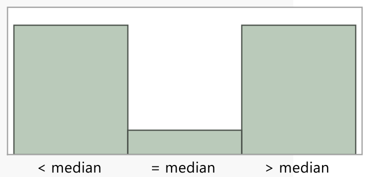


Frequencies

Level	Count	Prob
< mean	49516	0.49516
= mean	930	0.00930
> mean	49554	0.49554
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



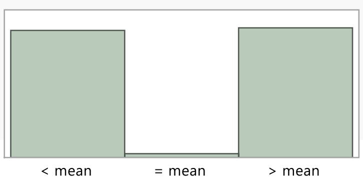
Frequencies

Level	Count	Prob
< median	45865	0.45865
= median	8299	0.08299
> median	45836	0.45836
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

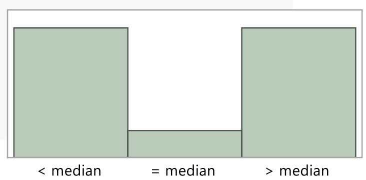


Frequencies

Level	Count	Prob
< mean	49104	0.49104
= mean	1012	0.01012
> mean	49884	0.49884
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



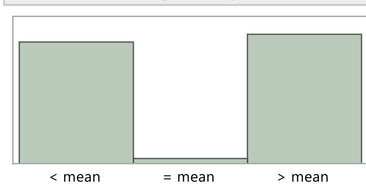
Frequencies

Level	Count	Prob
< median	45462	0.45462
= median	9107	0.09107
> median	45431	0.45431
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=10, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

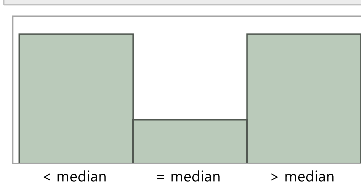


Frequencies

Level	Count	Prob
< mean	47645	0.47645
= mean	1624	0.01624
> mean	50731	0.50731
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



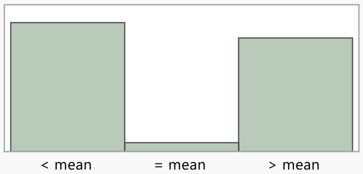
Frequencies

Level	Count	Prob
< median	43017	0.43017
= median	13994	0.13994
> median	42989	0.42989
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=5, Skewness Level=0.1

Data dominance (S-score)

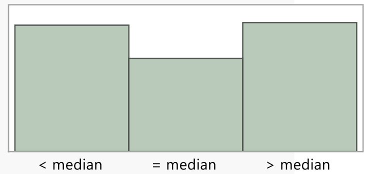


Frequencies

Level	Count	Prob
< mean	51577	0.51577
= mean	3188	0.03188
> mean	45235	0.45235
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



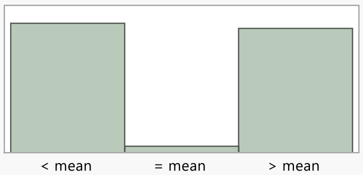
Frequencies

Level	Count	Prob
< median	36246	0.36246
= median	26644	0.26644
> median	37110	0.37110
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=5, Skewness Level=0.3

Data dominance (S-score)

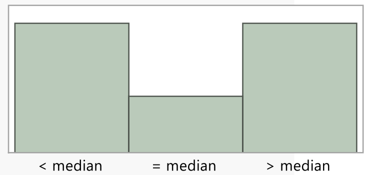


Frequencies

Level	Count	Prob
< mean	50058	0.50058
= mean	1931	0.01931
> mean	48011	0.48011
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



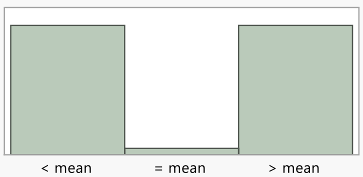
Frequencies

Level	Count	Prob
< median	41153	0.41153
= median	17575	0.17575
> median	41272	0.41272
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=5, Skewness Level=0.5

Data dominance (S-score)

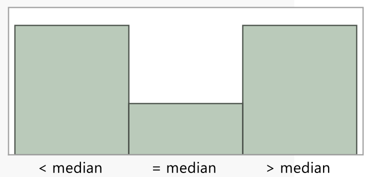


Frequencies

Level	Count	Prob
< mean	49050	0.49050
= mean	1784	0.01784
> mean	49166	0.49166
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



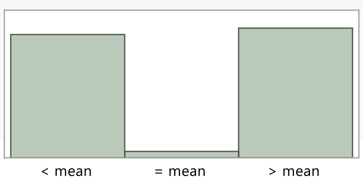
Frequencies

Level	Count	Prob
< median	41957	0.41957
= median	16181	0.16181
> median	41862	0.41862
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=5, Skewness Level=0.7

Data dominance (S-score)

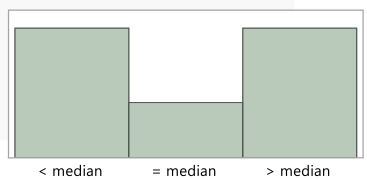


Frequencies

Level	Count	Prob
< mean	47848	0.47848
= mean	2027	0.02027
> mean	50125	0.50125
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



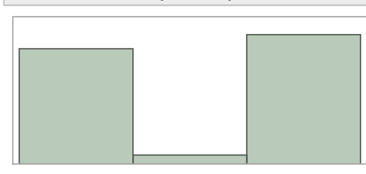
Frequencies

Level	Count	Prob
< median	41264	0.41264
= median	17497	0.17497
> median	41239	0.41239
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=5, Skewness Level=0.9

Data dominance (S-score)

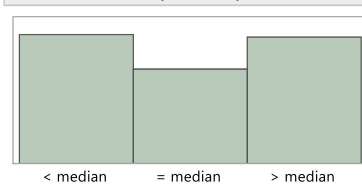


Frequencies

Level	Count	Prob
< mean	45563	0.45563
= mean	3108	0.03108
> mean	51329	0.51329
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



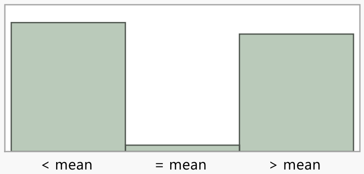
Frequencies

Level	Count	Prob
< median	36915	0.36915
= median	26890	0.26890
> median	36195	0.36195
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=10, Skewness Level=0.1

Data dominance (S-score)

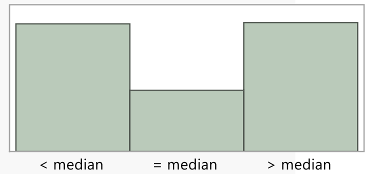


Frequencies

Level	Count	Prob
< mean	51303	0.51303
= mean	2132	0.02132
> mean	46565	0.46565
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



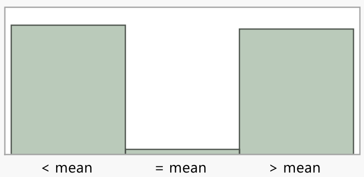
Frequencies

Level	Count	Prob
< median	40343	0.40343
= median	19071	0.19071
> median	40586	0.40586
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=10, Skewness Level=0.3

Data dominance (S-score)

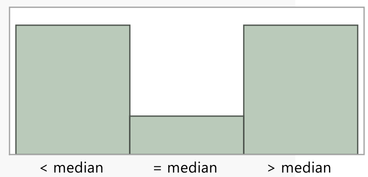


Frequencies

Level	Count	Prob
< mean	50056	0.50056
= mean	1375	0.01375
> mean	48569	0.48569
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



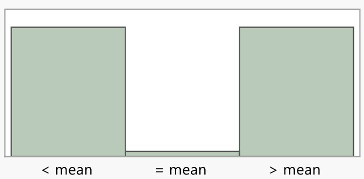
Frequencies

Level	Count	Prob
< median	43624	0.43624
= median	12777	0.12777
> median	43599	0.43599
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=10, Skewness Level=0.5

Data dominance (S-score)

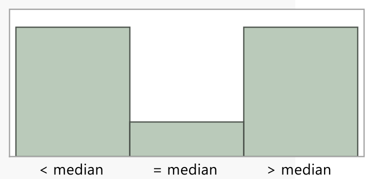


Frequencies

Level	Count	Prob
< mean	49287	0.49287
= mean	1295	0.01295
> mean	49418	0.49418
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



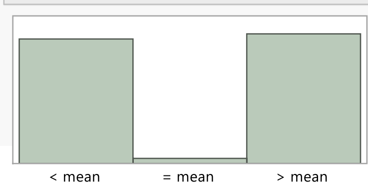
Frequencies

Level	Count	Prob
< median	44285	0.44285
= median	11411	0.11411
> median	44304	0.44304
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=10, Skewness Level=0.7

Data dominance (S-score)

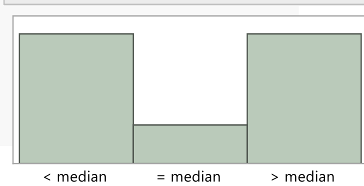


Frequencies

Level	Count	Prob
< mean	48380	0.48380
= mean	1472	0.01472
> mean	50148	0.50148
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



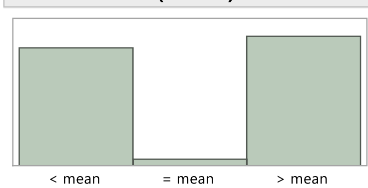
Frequencies

Level	Count	Prob
< median	43701	0.43701
= median	12704	0.12704
> median	43595	0.43595
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=10, Skewness Level=0.9

Data dominance (S-score)

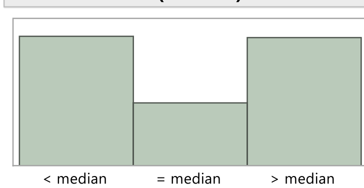


Frequencies

Level	Count	Prob
< mean	46529	0.46529
= mean	2246	0.02246
> mean	51225	0.51225
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



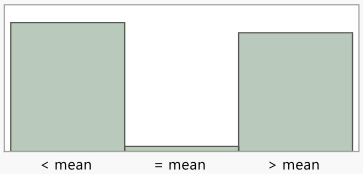
Frequencies

Level	Count	Prob
< median	40515	0.40515
= median	19262	0.19262
> median	40223	0.40223
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=15, Skewness Level=0.1

Data dominance (S-score)

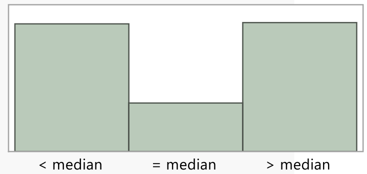


Frequencies

Level	Count	Prob
< mean	51113	0.51113
= mean	1734	0.01734
> mean	47153	0.47153
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



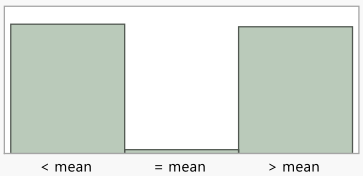
Frequencies

Level	Count	Prob
< median	41965	0.41965
= median	15747	0.15747
> median	42288	0.42288
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=15, Skewness Level=0.3

Data dominance (S-score)

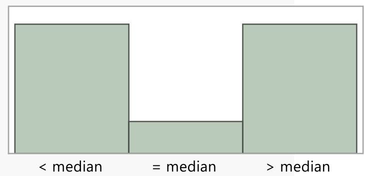


Frequencies

Level	Count	Prob
< mean	49948	0.49948
= mean	1159	0.01159
> mean	48893	0.48893
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



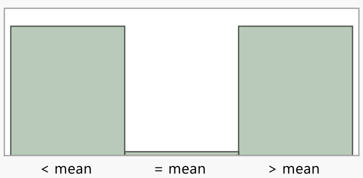
Frequencies

Level	Count	Prob
< median	44707	0.44707
= median	10527	0.10527
> median	44766	0.44766
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=15, Skewness Level=0.5

Data dominance (S-score)

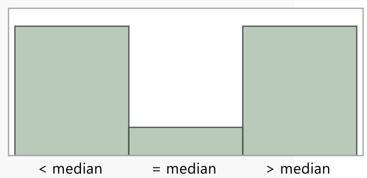


Frequencies

Level	Count	Prob
< mean	49449	0.49449
= mean	1063	0.01063
> mean	49488	0.49488
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



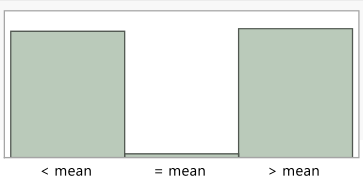
Frequencies

Level	Count	Prob
< median	45368	0.45368
= median	9311	0.09311
> median	45321	0.45321
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=15, Skewness Level=0.7

Data dominance (S-score)

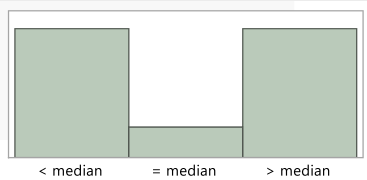


Frequencies

Level	Count	Prob
< mean	48838	0.48838
= mean	1113	0.01113
> mean	50049	0.50049
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



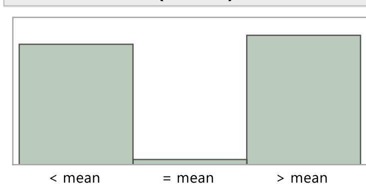
Frequencies

Level	Count	Prob
< median	44781	0.44781
= median	10427	0.10427
> median	44792	0.44792
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=15, Skewness Level=0.9

Data dominance (S-score)

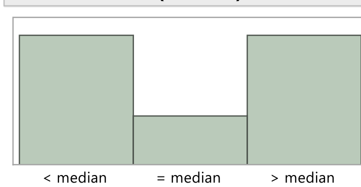


Frequencies

Level	Count	Prob
< mean	47380	0.47380
= mean	1734	0.01734
> mean	50886	0.50886
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



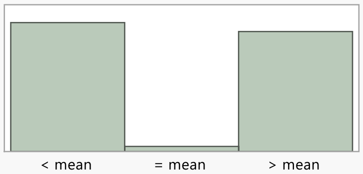
Frequencies

Level	Count	Prob
< median	42214	0.42214
= median	15678	0.15678
> median	42108	0.42108
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=20, Skewness Level=0.1

Data dominance (S-score)

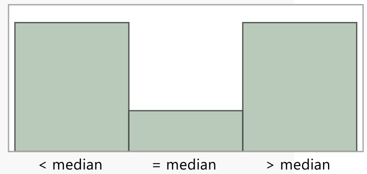


Frequencies

Level	Count	Prob
< mean	50928	0.50928
= mean	1586	0.01586
> mean	47486	0.47486
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



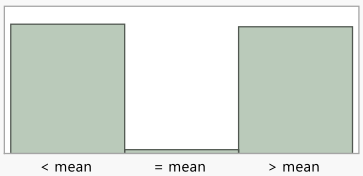
Frequencies

Level	Count	Prob
< median	43183	0.43183
= median	13542	0.13542
> median	43275	0.43275
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=20, Skewness Level=0.3

Data dominance (S-score)

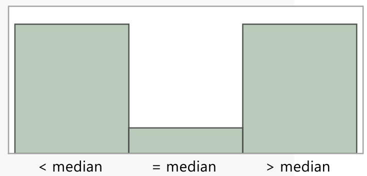


Frequencies

Level	Count	Prob
< mean	50071	0.50071
= mean	1028	0.01028
> mean	48901	0.48901
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



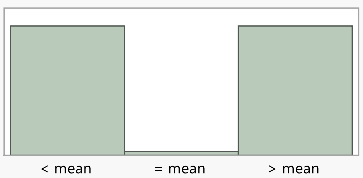
Frequencies

Level	Count	Prob
< median	45603	0.45603
= median	8780	0.08780
> median	45617	0.45617
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=20, Skewness Level=0.5

Data dominance (S-score)

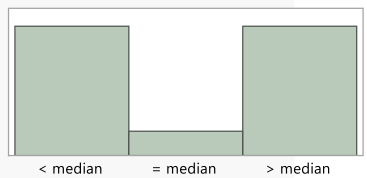


Frequencies

Level	Count	Prob
< mean	49635	0.49635
= mean	863	0.00863
> mean	49502	0.49502
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



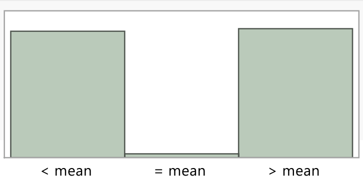
Frequencies

Level	Count	Prob
< median	45861	0.45861
= median	8296	0.08296
> median	45843	0.45843
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=20, Skewness Level=0.7

Data dominance (S-score)

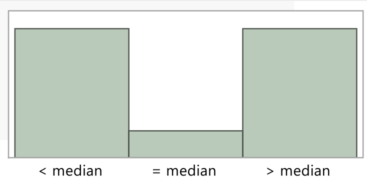


Frequencies

Level	Count	Prob
< mean	49016	0.49016
= mean	1027	0.01027
> mean	49957	0.49957
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



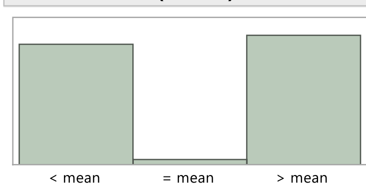
Frequencies

Level	Count	Prob
< median	45446	0.45446
= median	9062	0.09062
> median	45492	0.45492
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=20, Skewness Level=0.9

Data dominance (S-score)

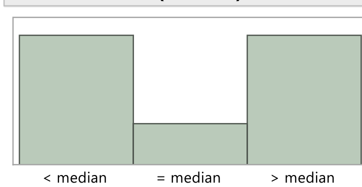


Frequencies

Level	Count	Prob
< mean	47466	0.47466
= mean	1660	0.01660
> mean	50874	0.50874
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



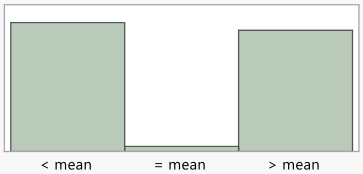
Frequencies

Level	Count	Prob
< median	43289	0.43289
= median	13448	0.13448
> median	43263	0.43263
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=25, Skewness Level=0.1

Data dominance (S-score)

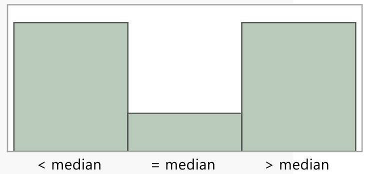


Frequencies

Level	Count	Prob
< mean	50832	0.50832
= mean	1456	0.01456
> mean	47712	0.47712
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



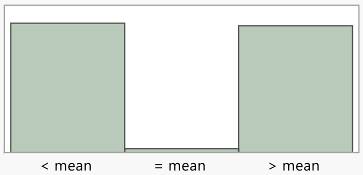
Frequencies

Level	Count	Prob
< median	43712	0.43712
= median	12524	0.12524
> median	43764	0.43764
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=25, Skewness Level=0.3

Data dominance (S-score)

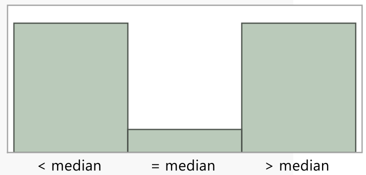


Frequencies

Level	Count	Prob
< mean	50103	0.50103
= mean	925	0.00925
> mean	48972	0.48972
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



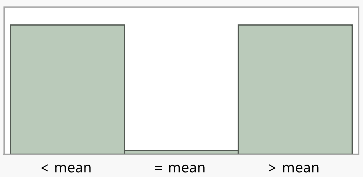
Frequencies

Level	Count	Prob
< median	45999	0.45999
= median	7976	0.07976
> median	46025	0.46025
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=25, Skewness Level=0.5

Data dominance (S-score)

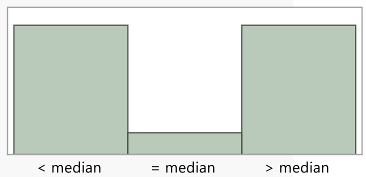


Frequencies

Level	Count	Prob
< mean	49527	0.49527
= mean	815	0.00815
> mean	49658	0.49658
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



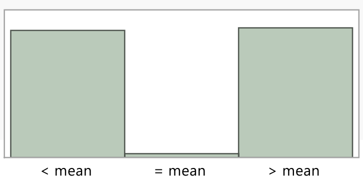
Frequencies

Level	Count	Prob
< median	46375	0.46375
= median	7262	0.07262
> median	46363	0.46363
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=25, Skewness Level=0.7

Data dominance (S-score)

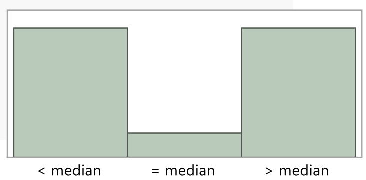


Frequencies

Level	Count	Prob
< mean	49129	0.49129
= mean	851	0.00851
> mean	50020	0.50020
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



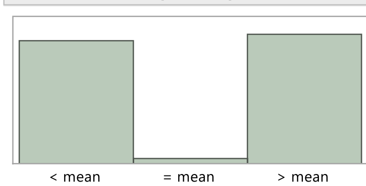
Frequencies

Level	Count	Prob
< median	45928	0.45928
= median	8142	0.08142
> median	45930	0.45930
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=10, Criteria=25, Skewness Level=0.9

Data dominance (S-score)

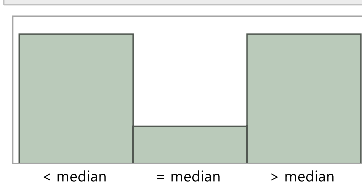


Frequencies

Level	Count	Prob
< mean	48061	0.48061
= mean	1482	0.01482
> mean	50457	0.50457
Total	100000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



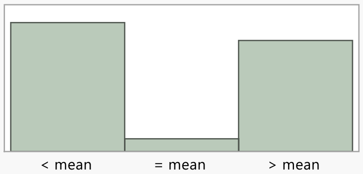
Frequencies

Level	Count	Prob
< median	43947	0.43947
= median	12247	0.12247
> median	43806	0.43806
Total	100000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=5, Skewness Level=0.1

Data dominance (S-score)

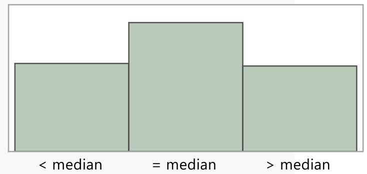


Frequencies

Level	Count	Prob
< mean	77061	0.51374
= mean	6805	0.04537
> mean	66134	0.44089
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



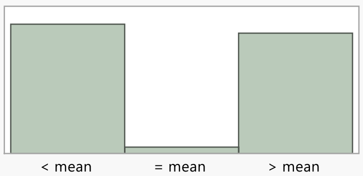
Frequencies

Level	Count	Prob
< median	43623	0.29082
= median	64043	0.42695
> median	42334	0.28223
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=5, Skewness Level=0.3

Data dominance (S-score)

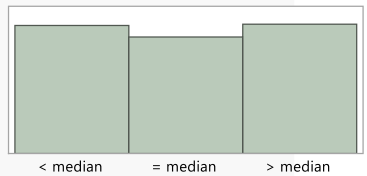


Frequencies

Level	Count	Prob
< mean	76096	0.50731
= mean	3004	0.02003
> mean	70900	0.47267
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



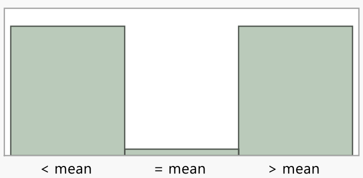
Frequencies

Level	Count	Prob
< median	51358	0.34239
= median	46768	0.31179
> median	51874	0.34583
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=5, Skewness Level=0.5

Data dominance (S-score)

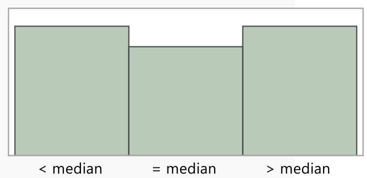


Frequencies

Level	Count	Prob
< mean	73467	0.48978
= mean	2773	0.01849
> mean	73760	0.49173
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



Frequencies

Level	Count	Prob
< median	52736	0.35157
= median	44346	0.29564
> median	52918	0.35279
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=5, Skewness Level=0.7

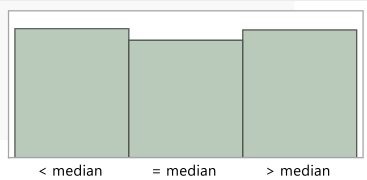
Data dominance (S-score)

Frequencies

Level	Count	Prob
< mean	71078	0.47385
= mean	3129	0.02086
> mean	75793	0.50529
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



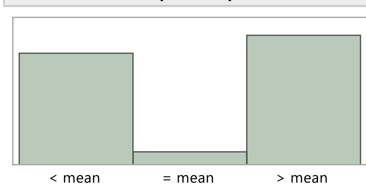
Frequencies

Level	Count	Prob
< median	51724	0.34483
= median	46833	0.31222
> median	51443	0.34295
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=5, Skewness Level=0.9

Data dominance (S-score)

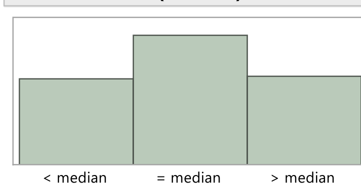


Frequencies

Level	Count	Prob
< mean	66054	0.44036
= mean	6714	0.04476
> mean	77232	0.51488
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



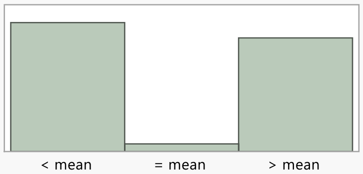
Frequencies

Level	Count	Prob
< median	42491	0.28327
= median	64041	0.42694
> median	43468	0.28979
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=10, Skewness Level=0.1

Data dominance (S-score)

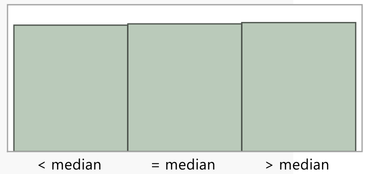


Frequencies

Level	Count	Prob
< mean	78005	0.52003
= mean	3548	0.02365
> mean	68447	0.45631
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



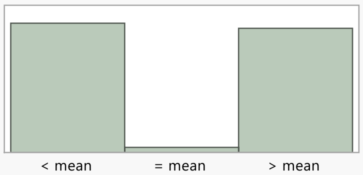
Frequencies

Level	Count	Prob
< median	49364	0.32909
= median	50130	0.33420
> median	50506	0.33671
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=10, Skewness Level=0.3

Data dominance (S-score)

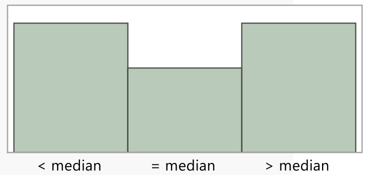


Frequencies

Level	Count	Prob
< mean	75685	0.50457
= mean	2008	0.01339
> mean	72307	0.48205
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



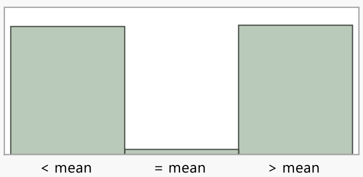
Frequencies

Level	Count	Prob
< median	56630	0.37753
= median	36678	0.24452
> median	56692	0.37795
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=10, Skewness Level=0.5

Data dominance (S-score)

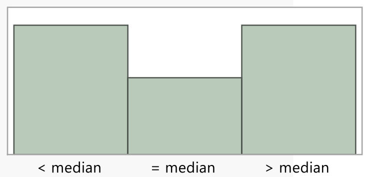


Frequencies

Level	Count	Prob
< mean	73814	0.49209
= mean	1950	0.01300
> mean	74236	0.49491
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



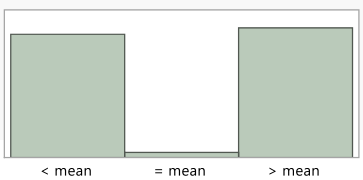
Frequencies

Level	Count	Prob
< median	57869	0.38579
= median	34372	0.22915
> median	57759	0.38506
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=10, Skewness Level=0.7

Data dominance (S-score)

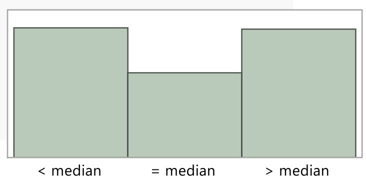


Frequencies

Level	Count	Prob
< mean	72234	0.48156
= mean	1959	0.01306
> mean	75807	0.50538
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



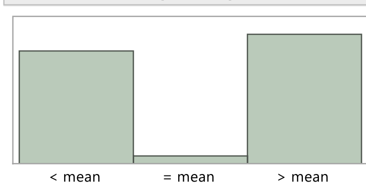
Frequencies

Level	Count	Prob
< median	56777	0.37851
= median	36803	0.24535
> median	56420	0.37613
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=10, Skewness Level=0.9

Data dominance (S-score)

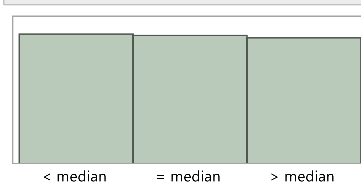


Frequencies

Level	Count	Prob
< mean	68122	0.45415
= mean	3593	0.02395
> mean	78285	0.52190
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



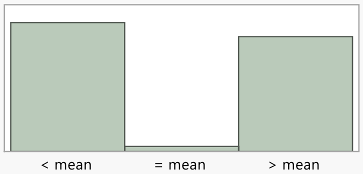
Frequencies

Level	Count	Prob
< median	50654	0.33769
= median	50253	0.33502
> median	49093	0.32729
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=15, Skewness Level=0.1

Data dominance (S-score)

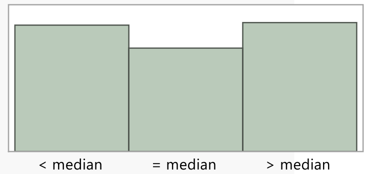


Frequencies

Level	Count	Prob
< mean	77924	0.51949
= mean	2546	0.01697
> mean	69530	0.46353
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



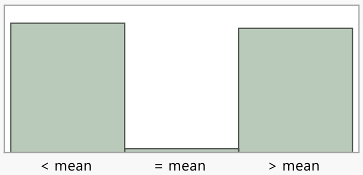
Frequencies

Level	Count	Prob
< median	52931	0.35287
= median	43241	0.28827
> median	53828	0.35885
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=15, Skewness Level=0.3

Data dominance (S-score)

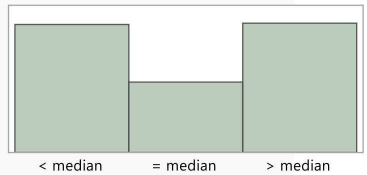


Frequencies

Level	Count	Prob
< mean	75578	0.50385
= mean	1742	0.01161
> mean	72680	0.48453
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



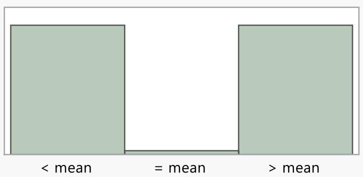
Frequencies

Level	Count	Prob
< median	58810	0.39207
= median	32021	0.21347
> median	59169	0.39446
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=15, Skewness Level=0.5

Data dominance (S-score)

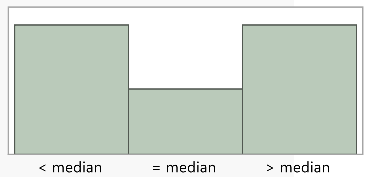


Frequencies

Level	Count	Prob
< mean	74131	0.49421
= mean	1497	0.00998
> mean	74372	0.49581
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



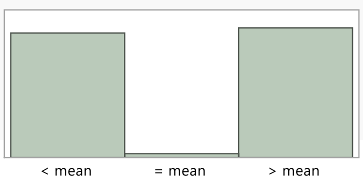
Frequencies

Level	Count	Prob
< median	59965	0.39977
= median	30179	0.20119
> median	59856	0.39904
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=15, Skewness Level=0.7

Data dominance (S-score)

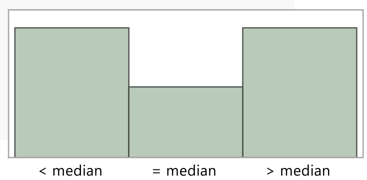


Frequencies

Level	Count	Prob
< mean	72651	0.48434
= mean	1702	0.01135
> mean	75647	0.50431
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



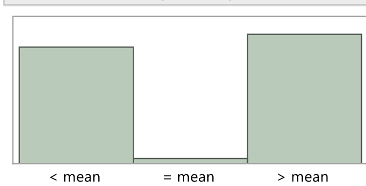
Frequencies

Level	Count	Prob
< median	59057	0.39371
= median	32121	0.21414
> median	58822	0.39215
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=15, Skewness Level=0.9

Data dominance (S-score)

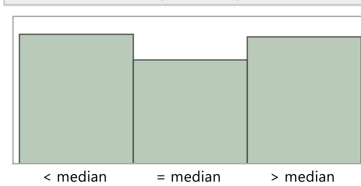


Frequencies

Level	Count	Prob
< mean	69750	0.46500
= mean	2570	0.01713
> mean	77680	0.51787
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



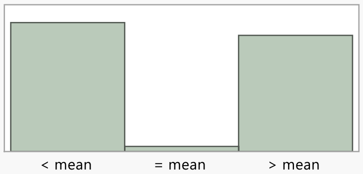
Frequencies

Level	Count	Prob
< median	53992	0.35995
= median	43275	0.28850
> median	52733	0.35155
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=20, Skewness Level=0.1

Data dominance (S-score)

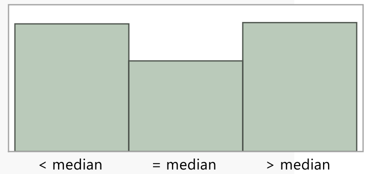


Frequencies

Level	Count	Prob
< mean	77604	0.51736
= mean	2248	0.01499
> mean	70148	0.46765
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



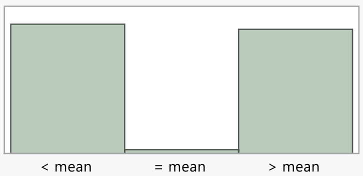
Frequencies

Level	Count	Prob
< median	55287	0.36858
= median	38898	0.25932
> median	55815	0.37210
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=20, Skewness Level=0.3

Data dominance (S-score)

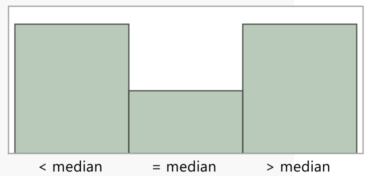


Frequencies

Level	Count	Prob
< mean	75644	0.50429
= mean	1413	0.00942
> mean	72943	0.48629
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



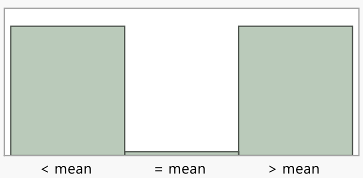
Frequencies

Level	Count	Prob
< median	60305	0.40203
= median	29248	0.19499
> median	60447	0.40298
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=20, Skewness Level=0.5

Data dominance (S-score)

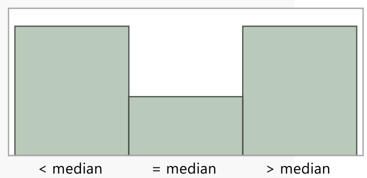


Frequencies

Level	Count	Prob
< mean	74524	0.49683
= mean	1309	0.00873
> mean	74167	0.49445
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



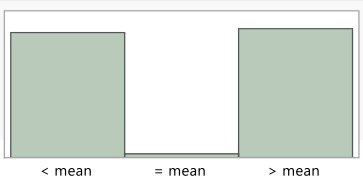
Frequencies

Level	Count	Prob
< median	61395	0.40930
= median	27345	0.18230
> median	61260	0.40840
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=20, Skewness Level=0.7

Data dominance (S-score)

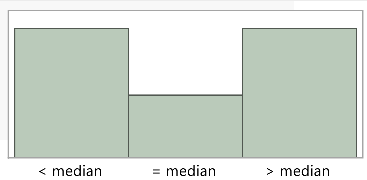


Frequencies

Level	Count	Prob
< mean	73120	0.48747
= mean	1406	0.00937
> mean	75474	0.50316
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



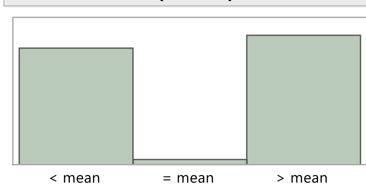
Frequencies

Level	Count	Prob
< median	60565	0.40377
= median	29140	0.19427
> median	60295	0.40197
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=20, Skewness Level=0.9

Data dominance (S-score)

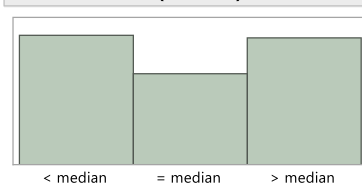


Frequencies

Level	Count	Prob
< mean	70007	0.46671
= mean	2213	0.01475
> mean	77780	0.51853
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



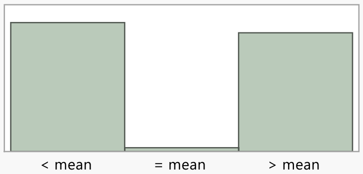
Frequencies

Level	Count	Prob
< median	55907	0.37271
= median	39034	0.26023
> median	55059	0.36706
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=25, Skewness Level=0.1

Data dominance (S-score)

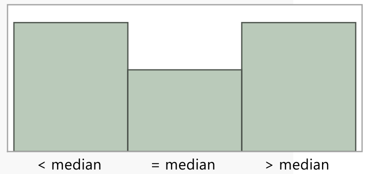


Frequencies

Level	Count	Prob
< mean	77310	0.51540
= mean	1851	0.01234
> mean	70839	0.47226
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



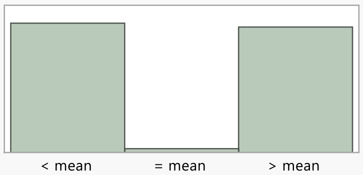
Frequencies

Level	Count	Prob
< median	56840	0.37893
= median	36109	0.24073
> median	57051	0.38034
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=25, Skewness Level=0.3

Data dominance (S-score)

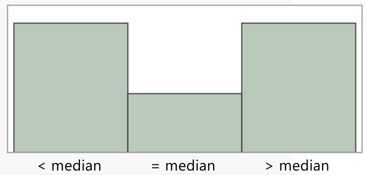


Frequencies

Level	Count	Prob
< mean	75398	0.50265
= mean	1242	0.00828
> mean	73360	0.48907
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



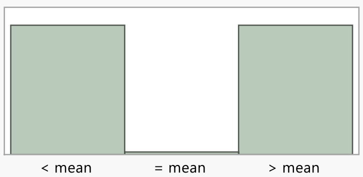
Frequencies

Level	Count	Prob
< median	61193	0.40795
= median	27367	0.18245
> median	61440	0.40960
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=25, Skewness Level=0.5

Data dominance (S-score)

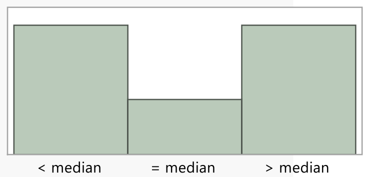


Frequencies

Level	Count	Prob
< mean	74349	0.49566
= mean	1088	0.00725
> mean	74563	0.49709
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



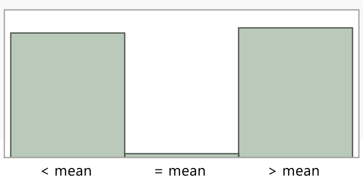
Frequencies

Level	Count	Prob
< median	62123	0.41415
= median	25822	0.17215
> median	62055	0.41370
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=25, Skewness Level=0.7

Data dominance (S-score)

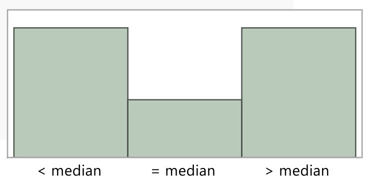


Frequencies

Level	Count	Prob
< mean	73052	0.48701
= mean	1190	0.00793
> mean	75758	0.50505
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



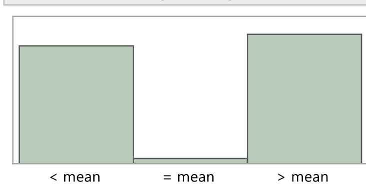
Frequencies

Level	Count	Prob
< median	61552	0.41035
= median	27169	0.18113
> median	61279	0.40853
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=15, Criteria=25, Skewness Level=0.9

Data dominance (S-score)

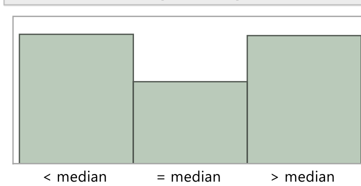


Frequencies

Level	Count	Prob
< mean	70622	0.47081
= mean	1950	0.01300
> mean	77428	0.51619
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



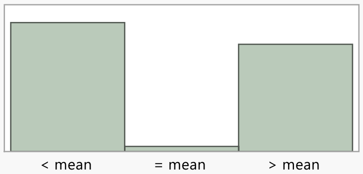
Frequencies

Level	Count	Prob
< median	57113	0.38075
= median	36256	0.24171
> median	56631	0.37754
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

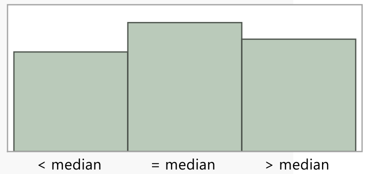


Frequencies

Level	Count	Prob
< mean	80785	0.53857
= mean	2401	0.01601
> mean	66814	0.44543
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



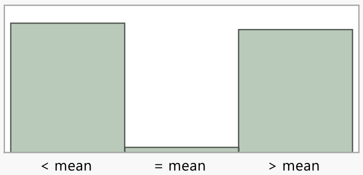
Frequencies

Level	Count	Prob
< median	43850	0.29233
= median	56660	0.37773
> median	49490	0.32993
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

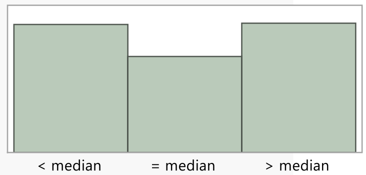


Frequencies

Level	Count	Prob
< mean	75982	0.50655
= mean	2202	0.01468
> mean	71816	0.47877
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



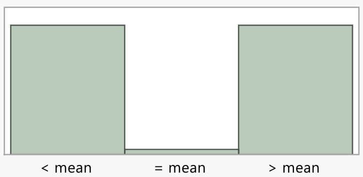
Frequencies

Level	Count	Prob
< median	54241	0.36161
= median	40840	0.27227
> median	54919	0.36613
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

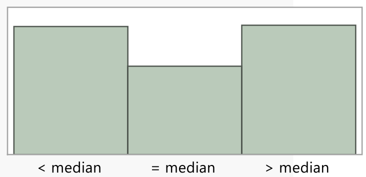


Frequencies

Level	Count	Prob
< mean	74096	0.49397
= mean	2083	0.01389
> mean	73821	0.49214
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



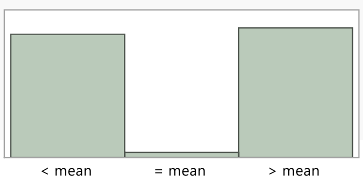
Frequencies

Level	Count	Prob
< median	55636	0.37091
= median	38246	0.25497
> median	56118	0.37412
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

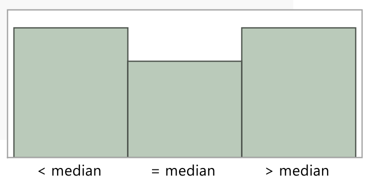


Frequencies

Level	Count	Prob
< mean	71965	0.47977
= mean	2335	0.01557
> mean	75700	0.50467
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



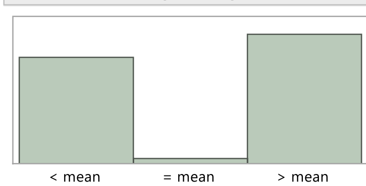
Frequencies

Level	Count	Prob
< median	54692	0.36461
= median	40687	0.27125
> median	54621	0.36414
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

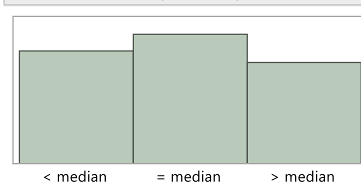


Frequencies

Level	Count	Prob
< mean	66749	0.44499
= mean	2263	0.01509
> mean	80988	0.53992
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



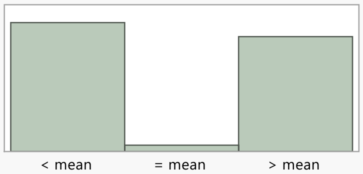
Frequencies

Level	Count	Prob
< median	49396	0.32931
= median	56625	0.37750
> median	43979	0.29319
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

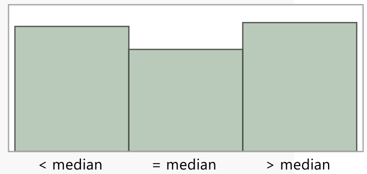


Frequencies

Level	Count	Prob
< mean	77847	0.51898
= mean	2765	0.01843
> mean	69388	0.46259
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



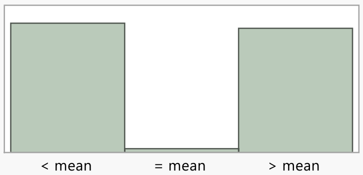
Frequencies

Level	Count	Prob
< median	52776	0.35184
= median	43006	0.28671
> median	54218	0.36145
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

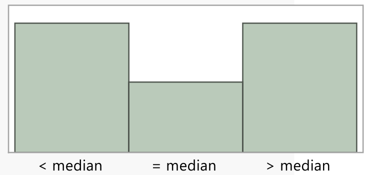


Frequencies

Level	Count	Prob
< mean	75568	0.50379
= mean	1553	0.01035
> mean	72879	0.48586
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



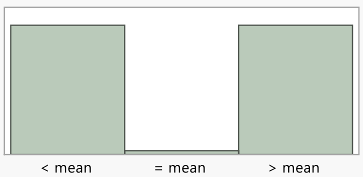
Frequencies

Level	Count	Prob
< median	59043	0.39362
= median	31828	0.21219
> median	59129	0.39419
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

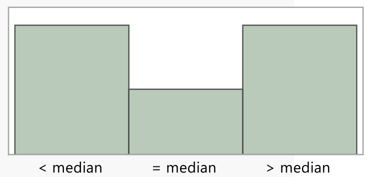


Frequencies

Level	Count	Prob
< mean	74377	0.49585
= mean	1566	0.01044
> mean	74057	0.49371
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



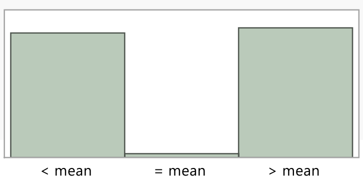
Frequencies

Level	Count	Prob
< median	59853	0.39902
= median	30083	0.20055
> median	60064	0.40043
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

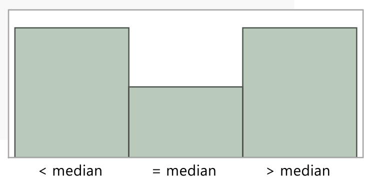


Frequencies

Level	Count	Prob
< mean	72732	0.48488
= mean	1668	0.01112
> mean	75600	0.50400
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



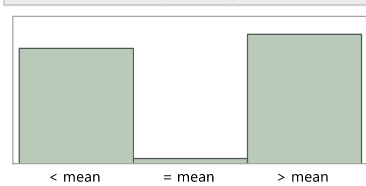
Frequencies

Level	Count	Prob
< median	59125	0.39417
= median	32005	0.21337
> median	58870	0.39247
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

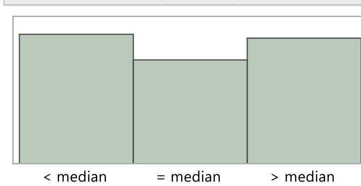


Frequencies

Level	Count	Prob
< mean	69459	0.46306
= mean	2654	0.01769
> mean	77887	0.51925
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



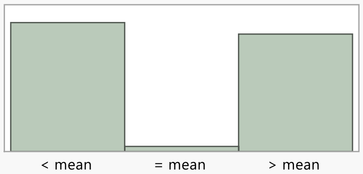
Frequencies

Level	Count	Prob
< median	54024	0.36016
= median	43393	0.28929
> median	52583	0.35055
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

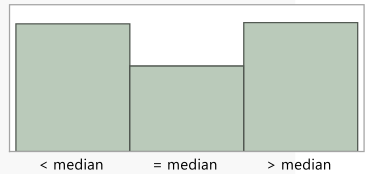


Frequencies

Level	Count	Prob
< mean	77461	0.51641
= mean	2076	0.01384
> mean	70463	0.46975
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



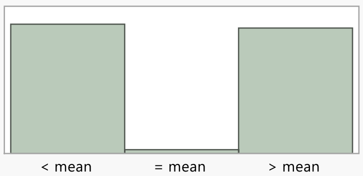
Frequencies

Level	Count	Prob
< median	56176	0.37451
= median	37265	0.24843
> median	56559	0.37706
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

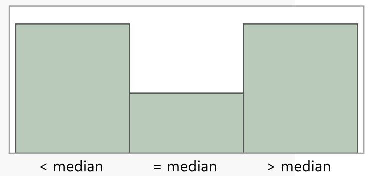


Frequencies

Level	Count	Prob
< mean	75669	0.50446
= mean	1275	0.00850
> mean	73056	0.48704
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



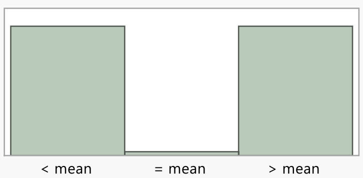
Frequencies

Level	Count	Prob
< median	60988	0.40659
= median	28017	0.18678
> median	60995	0.40663
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

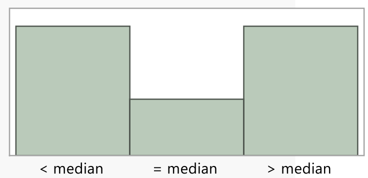


Frequencies

Level	Count	Prob
< mean	74355	0.49570
= mean	1261	0.00841
> mean	74384	0.49589
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



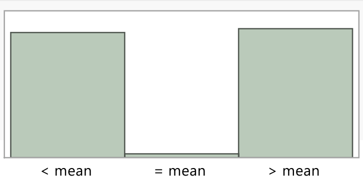
Frequencies

Level	Count	Prob
< median	61684	0.41123
= median	26459	0.17639
> median	61857	0.41238
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

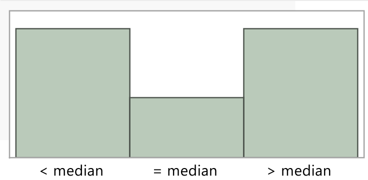


Frequencies

Level	Count	Prob
< mean	73102	0.48735
= mean	1221	0.00814
> mean	75677	0.50451
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



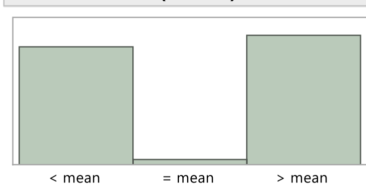
Frequencies

Level	Count	Prob
< median	61012	0.40675
= median	28127	0.18751
> median	60861	0.40574
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

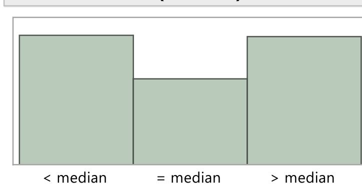


Frequencies

Level	Count	Prob
< mean	70556	0.47037
= mean	1985	0.01323
> mean	77459	0.51639
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



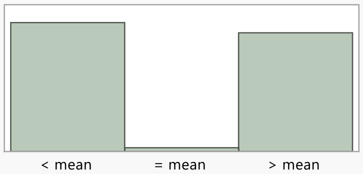
Frequencies

Level	Count	Prob
< median	56569	0.37713
= median	37404	0.24936
> median	56027	0.37351
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

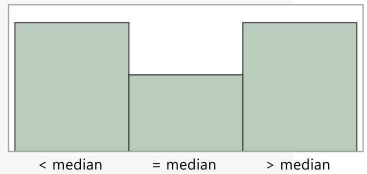


Frequencies

Level	Count	Prob
< mean	77150	0.51433
= mean	1797	0.01198
> mean	71053	0.47369
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



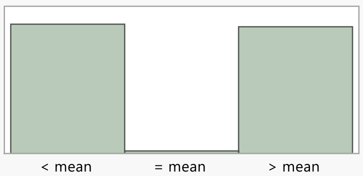
Frequencies

Level	Count	Prob
< median	57853	0.38569
= median	34038	0.22692
> median	58109	0.38739
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

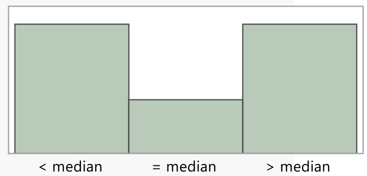


Frequencies

Level	Count	Prob
< mean	75359	0.50239
= mean	1116	0.00744
> mean	73525	0.49017
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



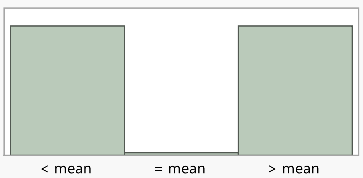
Frequencies

Level	Count	Prob
< median	62085	0.41390
= median	25778	0.17185
> median	62137	0.41425
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

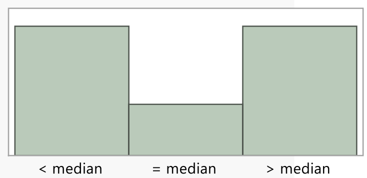


Frequencies

Level	Count	Prob
< mean	74451	0.49634
= mean	997	0.00665
> mean	74552	0.49701
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



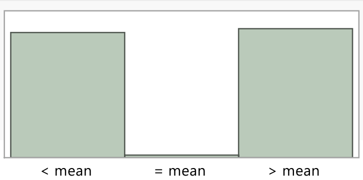
Frequencies

Level	Count	Prob
< median	62817	0.41878
= median	24488	0.16325
> median	62695	0.41797
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

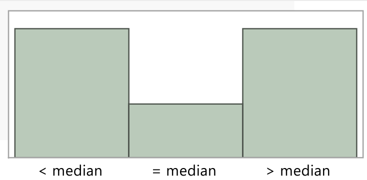


Frequencies

Level	Count	Prob
< mean	73287	0.48858
= mean	1098	0.00732
> mean	75615	0.50410
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



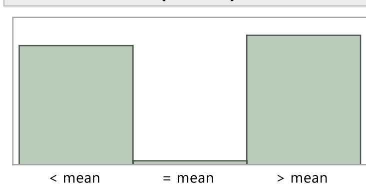
Frequencies

Level	Count	Prob
< median	62256	0.41504
= median	25588	0.17059
> median	62156	0.41437
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

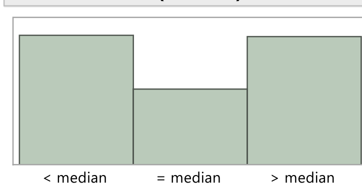


Frequencies

Level	Count	Prob
< mean	70974	0.47316
= mean	1815	0.01210
> mean	77211	0.51474
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



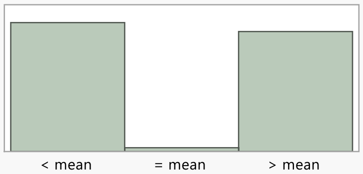
Frequencies

Level	Count	Prob
< median	58429	0.38953
= median	33916	0.22611
> median	57655	0.38437
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

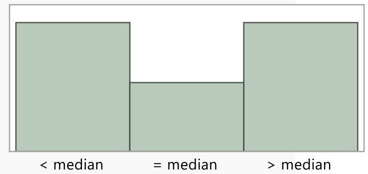


Frequencies

Level	Count	Prob
< mean	77041	0.51361
= mean	1645	0.01097
> mean	71314	0.47543
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



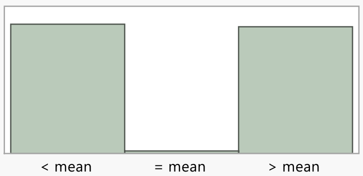
Frequencies

Level	Count	Prob
< median	59258	0.39505
= median	31336	0.20891
> median	59406	0.39604
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

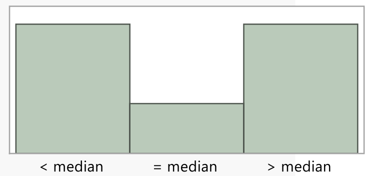


Frequencies

Level	Count	Prob
< mean	75283	0.50189
= mean	1105	0.00737
> mean	73612	0.49075
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



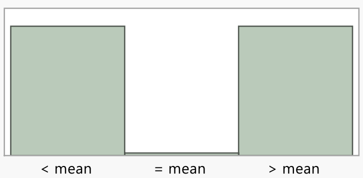
Frequencies

Level	Count	Prob
< median	62989	0.41993
= median	23952	0.15968
> median	63059	0.42039
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

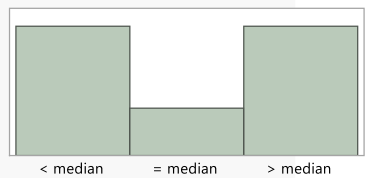


Frequencies

Level	Count	Prob
< mean	74342	0.49561
= mean	1020	0.00680
> mean	74638	0.49759
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



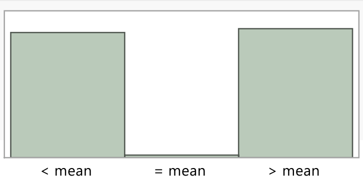
Frequencies

Level	Count	Prob
< median	63586	0.42391
= median	22992	0.15328
> median	63422	0.42281
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

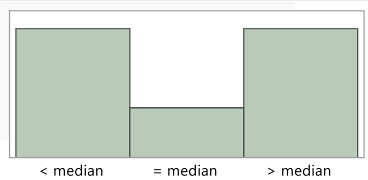


Frequencies

Level	Count	Prob
< mean	73381	0.48921
= mean	1038	0.00692
> mean	75581	0.50387
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



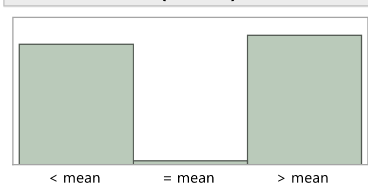
Frequencies

Level	Count	Prob
< median	62936	0.41957
= median	24219	0.16146
> median	62845	0.41897
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=15, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

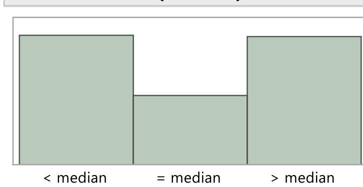


Frequencies

Level	Count	Prob
< mean	71334	0.47556
= mean	1611	0.01074
> mean	77055	0.51370
Total	150000	1.00000

N Missing 0
3 Levels

Data dominance (M-score)



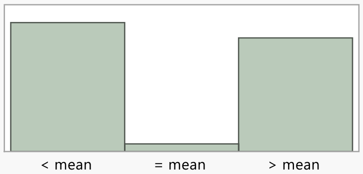
Frequencies

Level	Count	Prob
< median	59607	0.39738
= median	31371	0.20914
> median	59022	0.39348
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

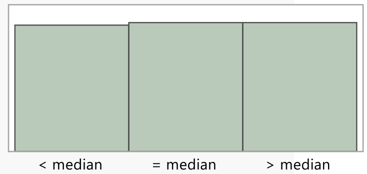


Frequencies

Level	Count	Prob
< mean	77844	0.51896
= mean	3694	0.02463
> mean	68462	0.45641
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



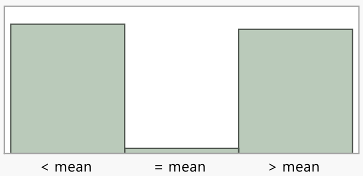
Frequencies

Level	Count	Prob
< median	49471	0.32981
= median	50307	0.33538
> median	50222	0.33481
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

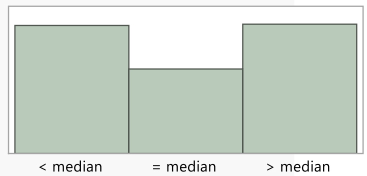


Frequencies

Level	Count	Prob
< mean	75631	0.50421
= mean	2061	0.01374
> mean	72308	0.48205
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



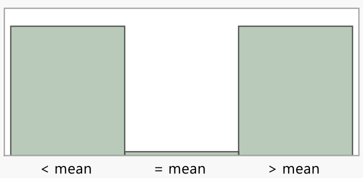
Frequencies

Level	Count	Prob
< median	56356	0.37571
= median	36993	0.24662
> median	56651	0.37767
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

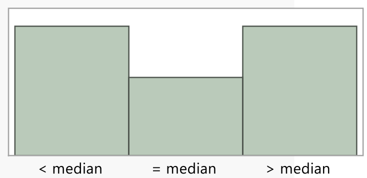


Frequencies

Level	Count	Prob
< mean	74220	0.49480
= mean	1772	0.01181
> mean	74008	0.49339
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



Frequencies

Level	Count	Prob
< median	57725	0.38483
= median	34678	0.23119
> median	57597	0.38398
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=5, Skewness Level=0.7

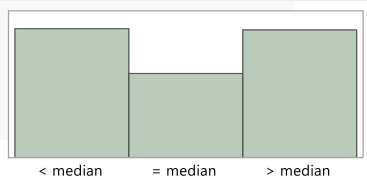
Data Dominance (S-score)

Frequencies

Level	Count	Prob
< mean	72086	0.48057
= mean	2006	0.01337
> mean	75908	0.50605
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



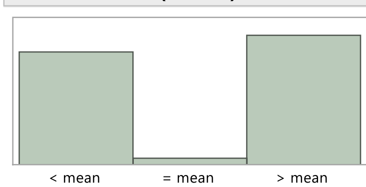
Frequencies

Level	Count	Prob
< median	56936	0.37957
= median	36793	0.24529
> median	56271	0.37514
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

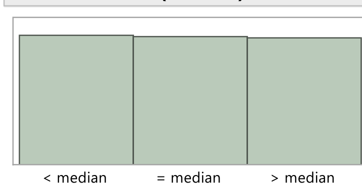


Frequencies

Level	Count	Prob
< mean	68386	0.45591
= mean	3219	0.02146
> mean	78395	0.52263
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



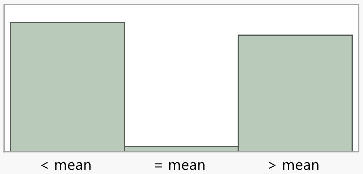
Frequencies

Level	Count	Prob
< median	50453	0.33635
= median	50143	0.33429
> median	49404	0.32936
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

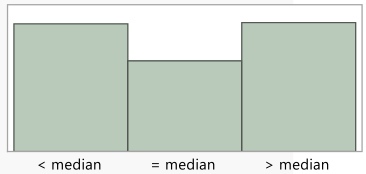


Frequencies

Level	Count	Prob
< mean	77668	0.51779
= mean	2068	0.01379
> mean	70264	0.46843
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



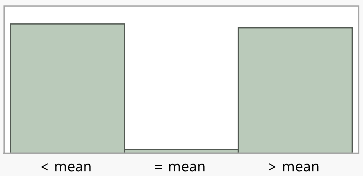
Frequencies

Level	Count	Prob
< median	55220	0.36813
= median	38949	0.25966
> median	55831	0.37221
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

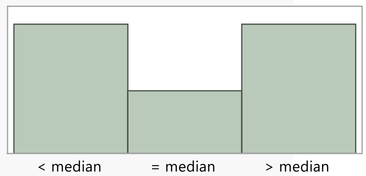


Frequencies

Level	Count	Prob
< mean	75427	0.50285
= mean	1282	0.00855
> mean	73291	0.48861
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



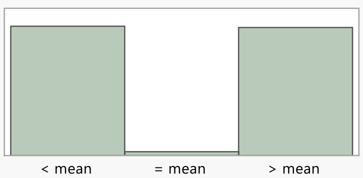
Frequencies

Level	Count	Prob
< median	60390	0.40260
= median	29189	0.19459
> median	60421	0.40281
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

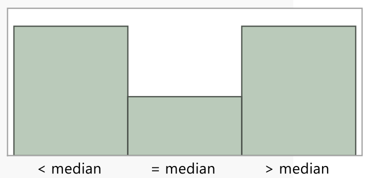


Frequencies

Level	Count	Prob
< mean	74673	0.49782
= mean	1348	0.00899
> mean	73979	0.49319
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



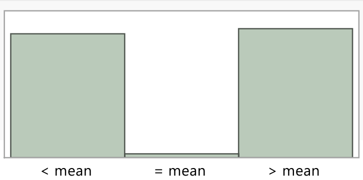
Frequencies

Level	Count	Prob
< median	61091	0.40727
= median	27661	0.18441
> median	61248	0.40832
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

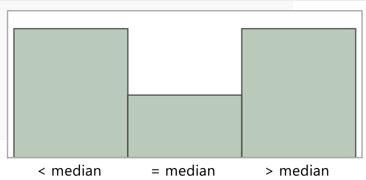


Frequencies

Level	Count	Prob
< mean	72966	0.48644
= mean	1393	0.00929
> mean	75641	0.50427
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



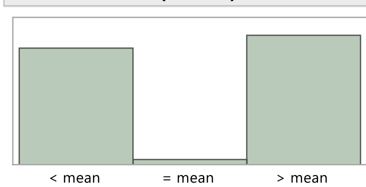
Frequencies

Level	Count	Prob
< median	60451	0.40301
= median	29029	0.19353
> median	60520	0.40347
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

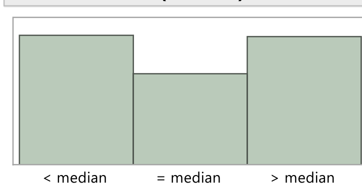


Frequencies

Level	Count	Prob
< mean	69973	0.46649
= mean	2211	0.01474
> mean	77816	0.51877
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



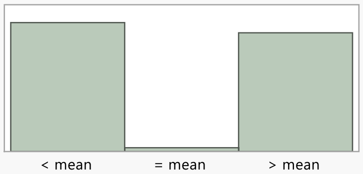
Frequencies

Level	Count	Prob
< median	55764	0.37176
= median	39083	0.26055
> median	55153	0.36769
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

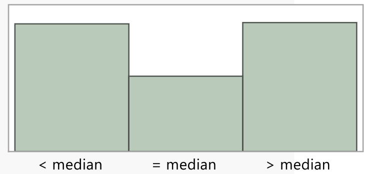


Frequencies

Level	Count	Prob
< mean	77260	0.51507
= mean	1833	0.01222
> mean	70907	0.47271
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



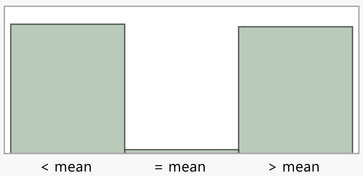
Frequencies

Level	Count	Prob
< median	57888	0.38592
= median	33876	0.22584
> median	58236	0.38824
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

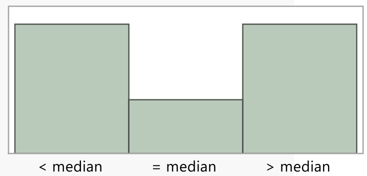


Frequencies

Level	Count	Prob
< mean	75109	0.50073
= mean	1147	0.00765
> mean	73744	0.49163
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



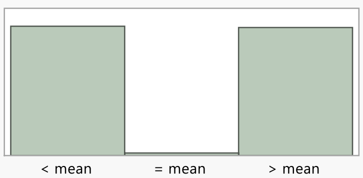
Frequencies

Level	Count	Prob
< median	62021	0.41347
= median	25713	0.17142
> median	62266	0.41511
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

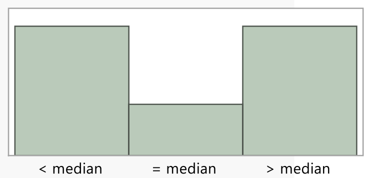


Frequencies

Level	Count	Prob
< mean	74682	0.49788
= mean	1097	0.00731
> mean	74221	0.49481
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



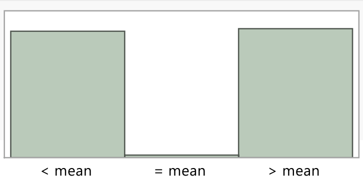
Frequencies

Level	Count	Prob
< median	62611	0.41741
= median	24624	0.16416
> median	62765	0.41843
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

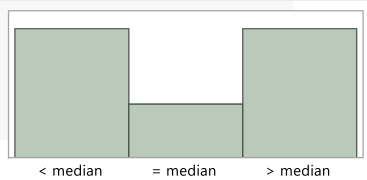


Frequencies

Level	Count	Prob
< mean	73625	0.49083
= mean	1052	0.00701
> mean	75323	0.50215
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



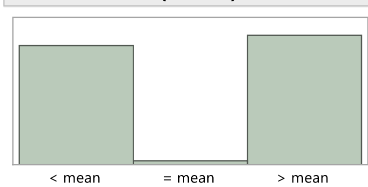
Frequencies

Level	Count	Prob
< median	62216	0.41477
= median	25594	0.17063
> median	62190	0.41460
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

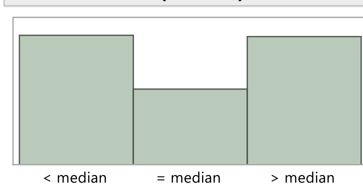


Frequencies

Level	Count	Prob
< mean	71023	0.47349
= mean	1768	0.01179
> mean	77209	0.51473
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



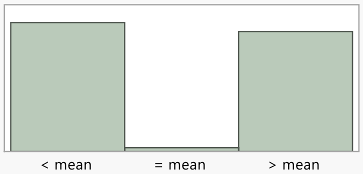
Frequencies

Level	Count	Prob
< median	58254	0.38836
= median	33820	0.22547
> median	57926	0.38617
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

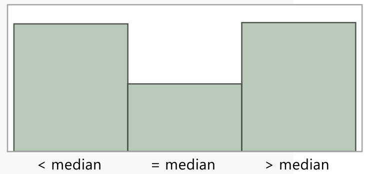


Frequencies

Level	Count	Prob
< mean	76782	0.51188
= mean	1592	0.01061
> mean	71626	0.47751
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



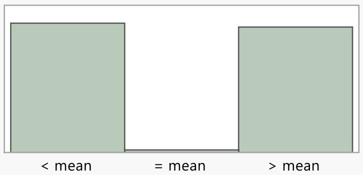
Frequencies

Level	Count	Prob
< median	59243	0.39495
= median	31002	0.20668
> median	59755	0.39837
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

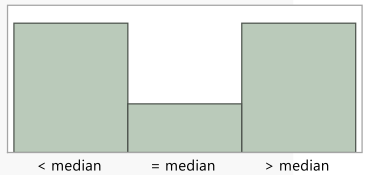


Frequencies

Level	Count	Prob
< mean	75510	0.50340
= mean	966	0.00644
> mean	73524	0.49016
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



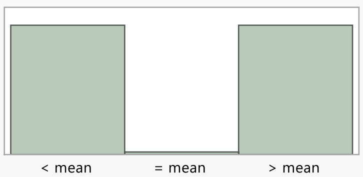
Frequencies

Level	Count	Prob
< median	63279	0.42186
= median	23439	0.15626
> median	63282	0.42188
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

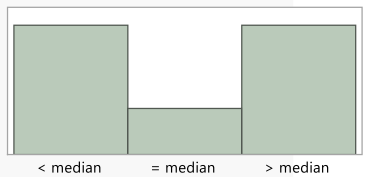


Frequencies

Level	Count	Prob
< mean	74597	0.49731
= mean	987	0.00658
> mean	74416	0.49611
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



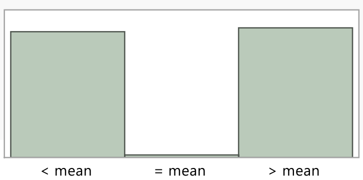
Frequencies

Level	Count	Prob
< median	63642	0.42428
= median	22624	0.15083
> median	63734	0.42489
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

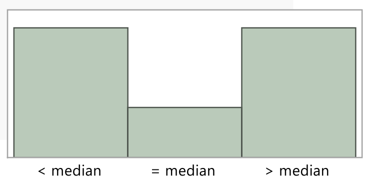


Frequencies

Level	Count	Prob
< mean	73445	0.48963
= mean	1031	0.00687
> mean	75524	0.50349
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



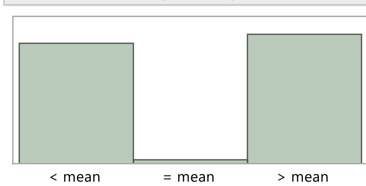
Frequencies

Level	Count	Prob
< median	63163	0.42109
= median	23698	0.15799
> median	63139	0.42093
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

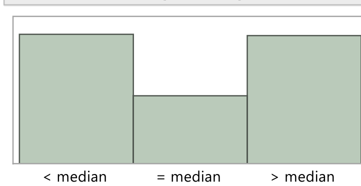


Frequencies

Level	Count	Prob
< mean	71592	0.47728
= mean	1492	0.00995
> mean	76916	0.51277
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



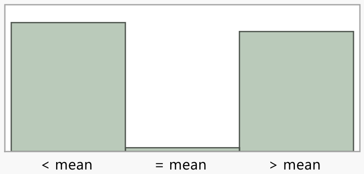
Frequencies

Level	Count	Prob
< median	59796	0.39864
= median	30805	0.20537
> median	59399	0.39599
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

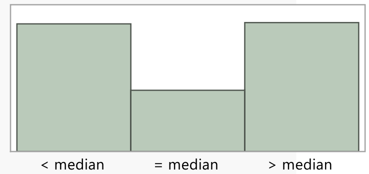


Frequencies

Level	Count	Prob
< mean	76839	0.51226
= mean	1373	0.00915
> mean	71788	0.47859
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



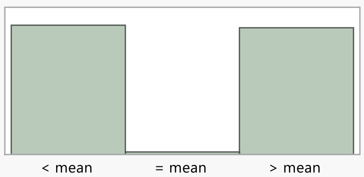
Frequencies

Level	Count	Prob
< median	60451	0.40301
= median	28631	0.19087
> median	60918	0.40612
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

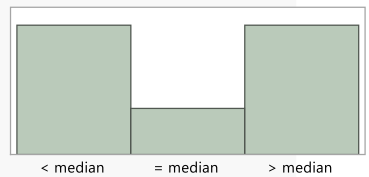


Frequencies

Level	Count	Prob
< mean	75301	0.50201
= mean	907	0.00605
> mean	73792	0.49195
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



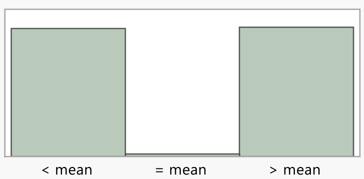
Frequencies

Level	Count	Prob
< median	63860	0.42573
= median	22106	0.14737
> median	64034	0.42689
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

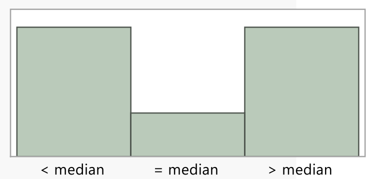


Frequencies

Level	Count	Prob
< mean	74298	0.49532
= mean	821	0.00547
> mean	74881	0.49921
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



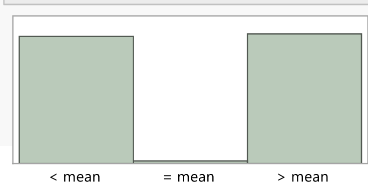
Frequencies

Level	Count	Prob
< median	64460	0.42973
= median	21114	0.14076
> median	64426	0.42951
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

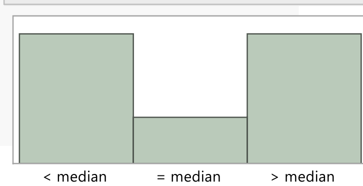


Frequencies

Level	Count	Prob
< mean	73814	0.49209
= mean	934	0.00623
> mean	75252	0.50168
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



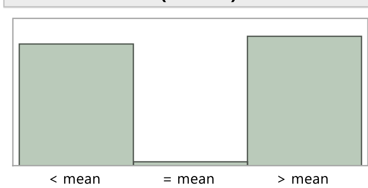
Frequencies

Level	Count	Prob
< median	63931	0.42621
= median	22114	0.14743
> median	63955	0.42637
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=15, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

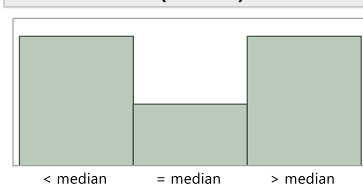


Frequencies

Level	Count	Prob
< mean	71798	0.47865
= mean	1511	0.01007
> mean	76691	0.51127
Total	150000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



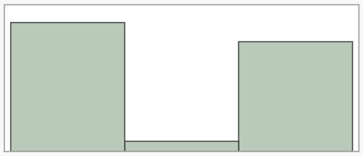
Frequencies

Level	Count	Prob
< median	60713	0.40475
= median	28529	0.19019
> median	60758	0.40505
Total	150000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

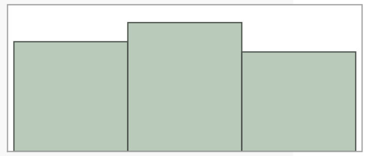


Frequencies

Level	Count	Prob
< mean	104062	0.52031
= mean	7275	0.03638
> mean	88663	0.44332
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



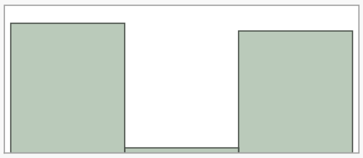
Frequencies

Level	Count	Prob
< median	64756	0.32378
= median	76456	0.38228
> median	58788	0.29394
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

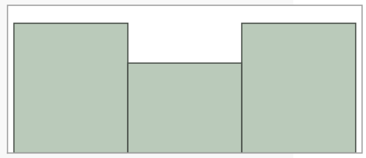


Frequencies

Level	Count	Prob
< mean	101204	0.50602
= mean	3343	0.01672
> mean	95453	0.47727
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



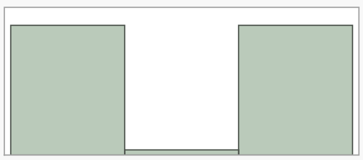
Frequencies

Level	Count	Prob
< median	74479	0.37240
= median	51183	0.25592
> median	74338	0.37169
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

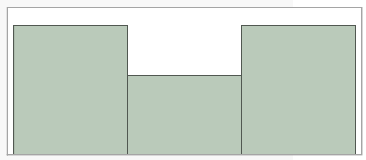


Frequencies

Level	Count	Prob
< mean	98438	0.49219
= mean	3037	0.01519
> mean	98525	0.49263
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



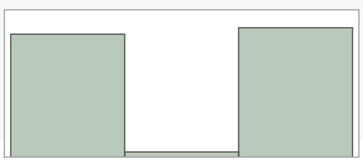
Frequencies

Level	Count	Prob
< median	76407	0.38204
= median	46974	0.23487
> median	76619	0.38310
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

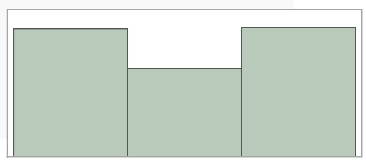


Frequencies

Level	Count	Prob
< mean	95718	0.47859
= mean	3345	0.01673
> mean	100937	0.50469
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



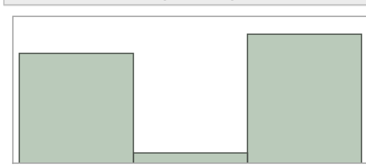
Frequencies

Level	Count	Prob
< median	74293	0.37147
= median	50883	0.25442
> median	74824	0.37412
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

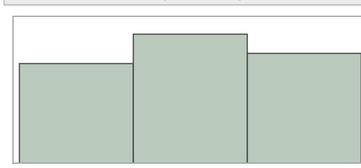


Frequencies

Level	Count	Prob
< mean	88642	0.44321
= mean	7189	0.03595
> mean	104169	0.52085
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



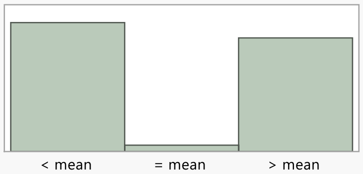
Frequencies

Level	Count	Prob
< median	58858	0.29429
= median	76391	0.38196
> median	64751	0.32376
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

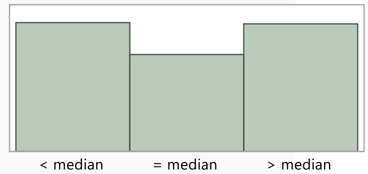


Frequencies

Level	Count	Prob
< mean	104110	0.52055
= mean	4093	0.02047
> mean	91797	0.45899
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



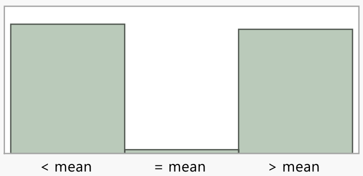
Frequencies

Level	Count	Prob
< median	72883	0.36442
= median	54906	0.27453
> median	72211	0.36106
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

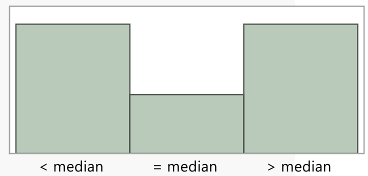


Frequencies

Level	Count	Prob
< mean	101108	0.50554
= mean	2092	0.01046
> mean	96800	0.48400
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



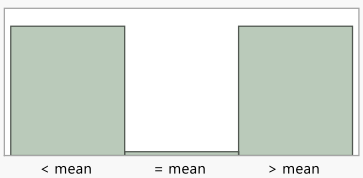
Frequencies

Level	Count	Prob
< median	81490	0.40745
= median	36745	0.18373
> median	81765	0.40883
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

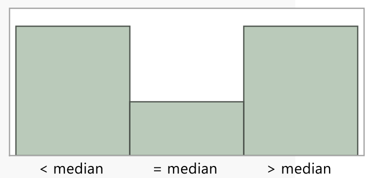


Frequencies

Level	Count	Prob
< mean	99268	0.49634
= mean	1730	0.00865
> mean	99002	0.49501
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



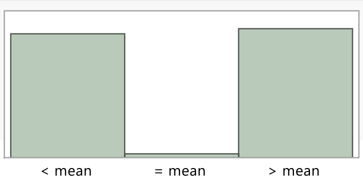
Frequencies

Level	Count	Prob
< median	83069	0.41535
= median	33714	0.16857
> median	83217	0.41609
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

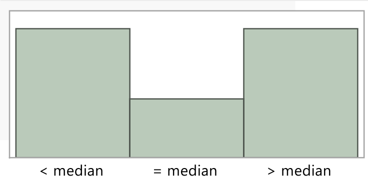


Frequencies

Level	Count	Prob
< mean	96906	0.48453
= mean	2049	0.01025
> mean	101045	0.50523
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



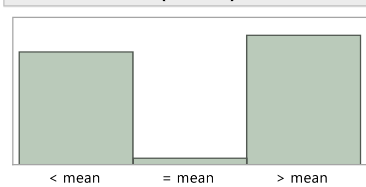
Frequencies

Level	Count	Prob
< median	81755	0.40878
= median	36730	0.18365
> median	81515	0.40758
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

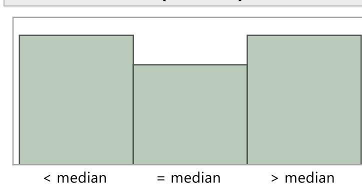


Frequencies

Level	Count	Prob
< mean	91584	0.45792
= mean	3722	0.01861
> mean	104694	0.52347
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



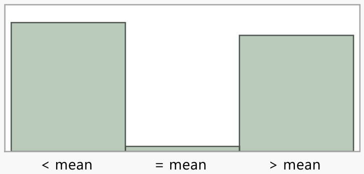
Frequencies

Level	Count	Prob
< median	72110	0.36055
= median	55478	0.27739
> median	72412	0.36206
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

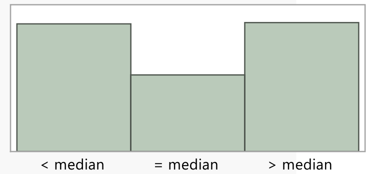


Frequencies

Level	Count	Prob
< mean	103896	0.51948
= mean	2973	0.01487
> mean	93131	0.46566
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



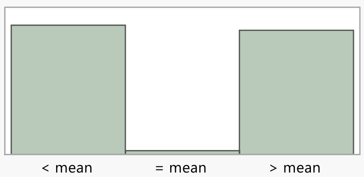
Frequencies

Level	Count	Prob
< median	76794	0.38397
= median	45880	0.22940
> median	77326	0.38663
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

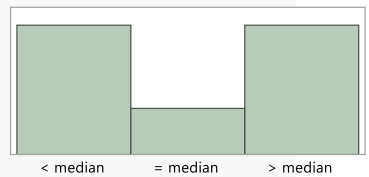


Frequencies

Level	Count	Prob
< mean	101049	0.50525
= mean	1561	0.00781
> mean	97390	0.48695
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



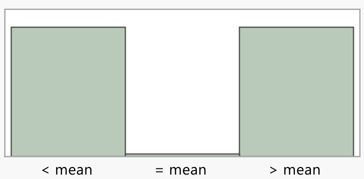
Frequencies

Level	Count	Prob
< median	84800	0.42400
= median	29996	0.14998
> median	85204	0.42602
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

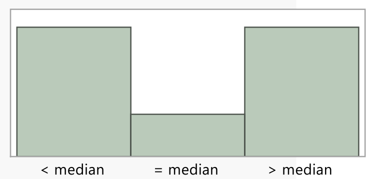


Frequencies

Level	Count	Prob
< mean	99442	0.49721
= mean	1440	0.00720
> mean	99118	0.49559
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



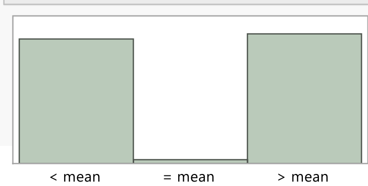
Frequencies

Level	Count	Prob
< median	86224	0.43112
= median	27460	0.13730
> median	86316	0.43158
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

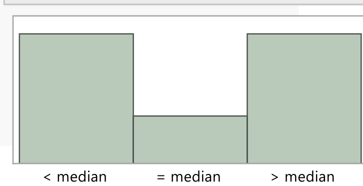


Frequencies

Level	Count	Prob
< mean	97265	0.48633
= mean	1588	0.00794
> mean	101147	0.50574
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



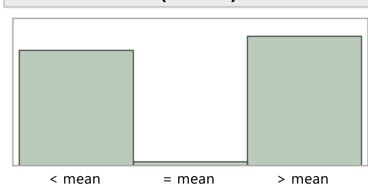
Frequencies

Level	Count	Prob
< median	84873	0.42437
= median	30389	0.15195
> median	84738	0.42369
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

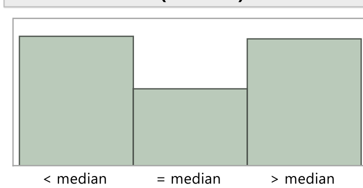


Frequencies

Level	Count	Prob
< mean	92825	0.46413
= mean	2613	0.01307
> mean	104562	0.52281
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



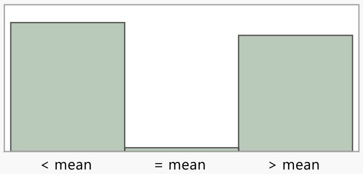
Frequencies

Level	Count	Prob
< median	77793	0.38897
= median	45596	0.22798
> median	76611	0.38306
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

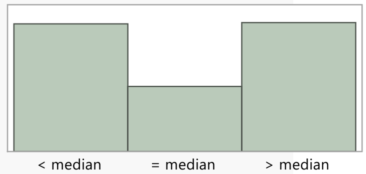


Frequencies

Level	Count	Prob
< mean	104110	0.52055
= mean	2178	0.01089
> mean	93712	0.46856
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



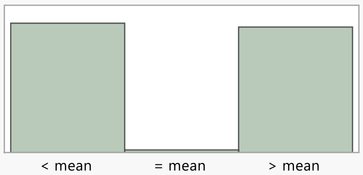
Frequencies

Level	Count	Prob
< median	79711	0.39856
= median	39976	0.19988
> median	80313	0.40157
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

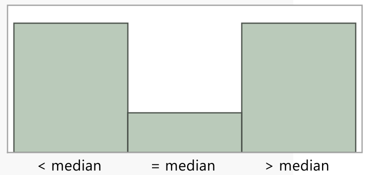


Frequencies

Level	Count	Prob
< mean	101019	0.50510
= mean	1414	0.00707
> mean	97567	0.48784
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



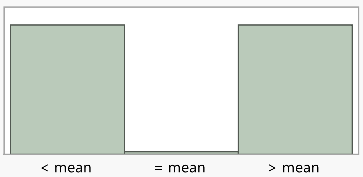
Frequencies

Level	Count	Prob
< median	87028	0.43514
= median	25968	0.12984
> median	87004	0.43502
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

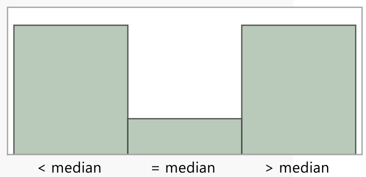


Frequencies

Level	Count	Prob
< mean	99149	0.49575
= mean	1343	0.00672
> mean	99508	0.49754
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



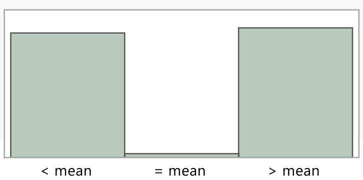
Frequencies

Level	Count	Prob
< median	88080	0.44040
= median	24014	0.12007
> median	87906	0.43953
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

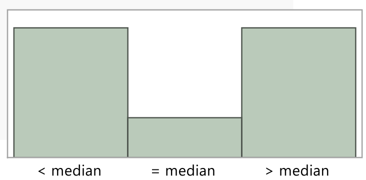


Frequencies

Level	Count	Prob
< mean	97452	0.48726
= mean	1524	0.00762
> mean	101024	0.50512
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



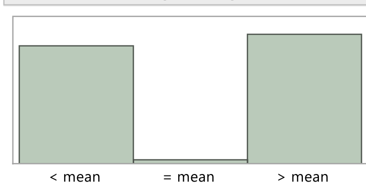
Frequencies

Level	Count	Prob
< median	87089	0.43545
= median	26154	0.13077
> median	86757	0.43379
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

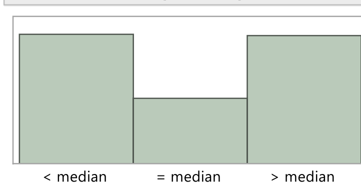


Frequencies

Level	Count	Prob
< mean	94172	0.47086
= mean	2245	0.01123
> mean	103583	0.51792
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



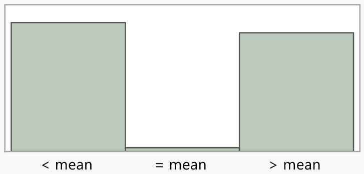
Frequencies

Level	Count	Prob
< median	80391	0.40196
= median	39812	0.19906
> median	79797	0.39899
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

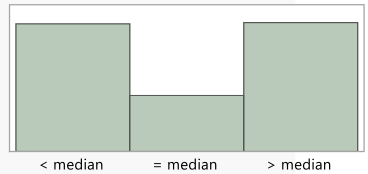


Frequencies

Level	Count	Prob
< mean	103364	0.51682
= mean	1855	0.00928
> mean	94781	0.47391
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



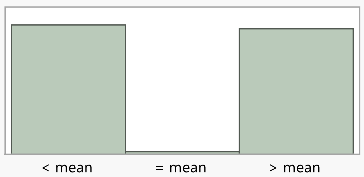
Frequencies

Level	Count	Prob
< median	81992	0.40996
= median	35505	0.17753
> median	82503	0.41252
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

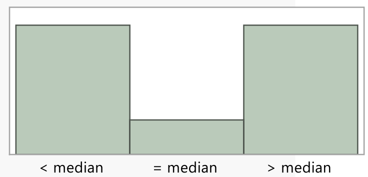


Frequencies

Level	Count	Prob
< mean	100690	0.50345
= mean	1176	0.00588
> mean	98134	0.49067
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



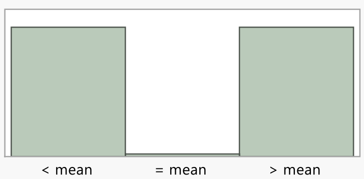
Frequencies

Level	Count	Prob
< median	88340	0.44170
= median	23356	0.11678
> median	88304	0.44152
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

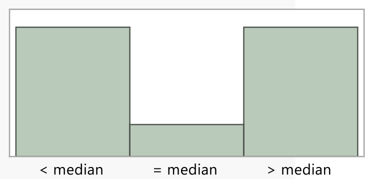


Frequencies

Level	Count	Prob
< mean	99471	0.49736
= mean	1288	0.00644
> mean	99241	0.49621
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



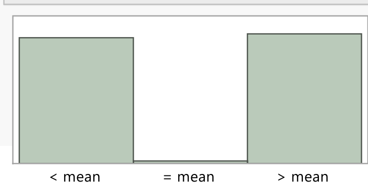
Frequencies

Level	Count	Prob
< median	89275	0.44638
= median	21309	0.10655
> median	89416	0.44708
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

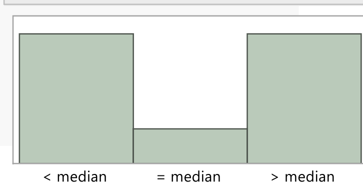


Frequencies

Level	Count	Prob
< mean	98015	0.49008
= mean	1203	0.00602
> mean	100782	0.50391
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



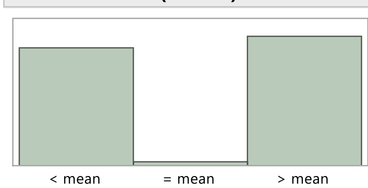
Frequencies

Level	Count	Prob
< median	88460	0.44230
= median	23159	0.11580
> median	88381	0.44191
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=3, Units=20, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

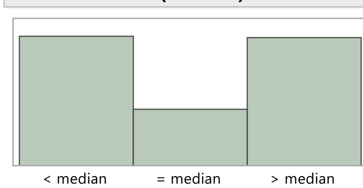


Frequencies

Level	Count	Prob
< mean	94271	0.47136
= mean	1901	0.00951
> mean	103828	0.51914
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



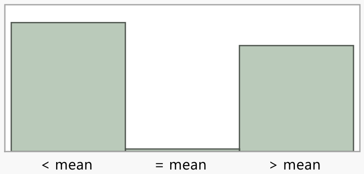
Frequencies

Level	Count	Prob
< median	82609	0.41305
= median	35631	0.17816
> median	81760	0.40880
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

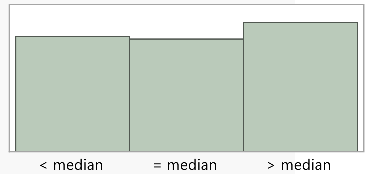


Frequencies

Level	Count	Prob
< mean	108891	0.54446
= mean	1611	0.00806
> mean	89498	0.44749
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



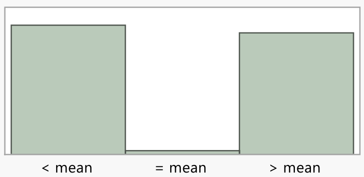
Frequencies

Level	Count	Prob
< median	64233	0.32117
= median	63197	0.31599
> median	72570	0.36285
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

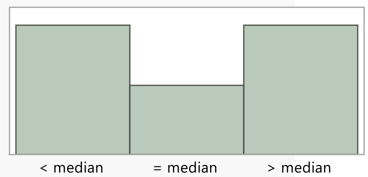


Frequencies

Level	Count	Prob
< mean	101957	0.50979
= mean	2111	0.01056
> mean	95932	0.47966
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



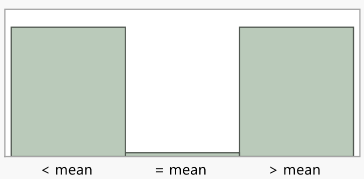
Frequencies

Level	Count	Prob
< median	78895	0.39448
= median	41885	0.20943
> median	79220	0.39610
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

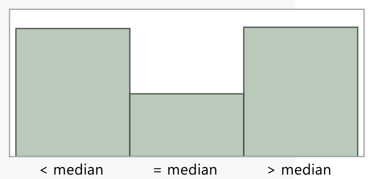


Frequencies

Level	Count	Prob
< mean	99130	0.49565
= mean	1984	0.00992
> mean	98886	0.49443
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



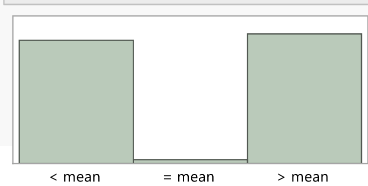
Frequencies

Level	Count	Prob
< median	80385	0.40193
= median	38785	0.19393
> median	80830	0.40415
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

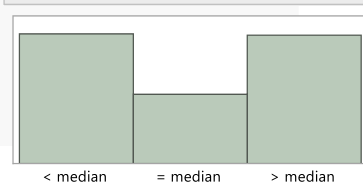


Frequencies

Level	Count	Prob
< mean	96319	0.48160
= mean	2031	0.01016
> mean	101650	0.50825
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



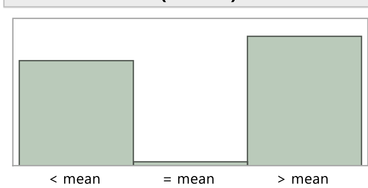
Frequencies

Level	Count	Prob
< median	79351	0.39676
= median	42026	0.21013
> median	78623	0.39312
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

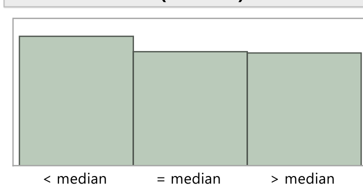


Frequencies

Level	Count	Prob
< mean	88983	0.44492
= mean	1759	0.00880
> mean	109258	0.54629
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



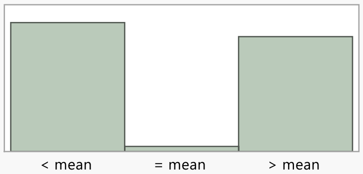
Frequencies

Level	Count	Prob
< median	72596	0.36298
= median	63982	0.31991
> median	63422	0.31711
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

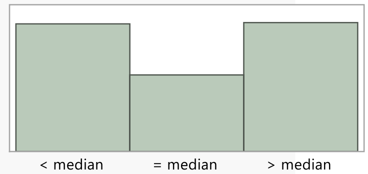


Frequencies

Level	Count	Prob
< mean	104272	0.52136
= mean	2709	0.01355
> mean	93019	0.46510
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



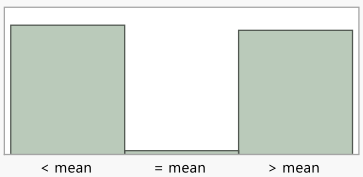
Frequencies

Level	Count	Prob
< median	76942	0.38471
= median	45673	0.22837
> median	77385	0.38693
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

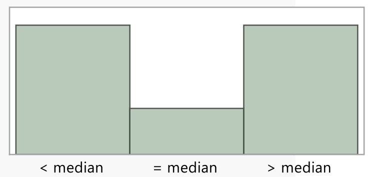


Frequencies

Level	Count	Prob
< mean	101132	0.50566
= mean	1658	0.00829
> mean	97210	0.48605
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



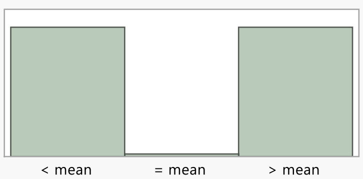
Frequencies

Level	Count	Prob
< median	84903	0.42452
= median	29959	0.14980
> median	85138	0.42569
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

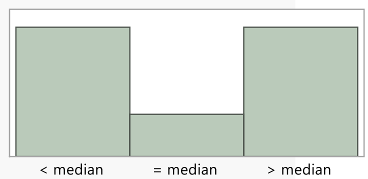


Frequencies

Level	Count	Prob
< mean	99332	0.49666
= mean	1447	0.00724
> mean	99221	0.49611
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



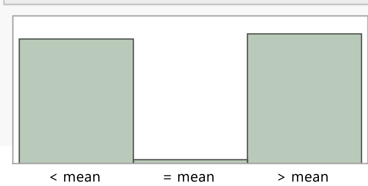
Frequencies

Level	Count	Prob
< median	86174	0.43087
= median	27650	0.13825
> median	86176	0.43088
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)

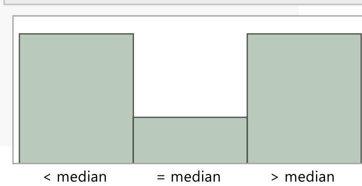


Frequencies

Level	Count	Prob
< mean	97280	0.48640
= mean	1641	0.00821
> mean	101079	0.50540
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



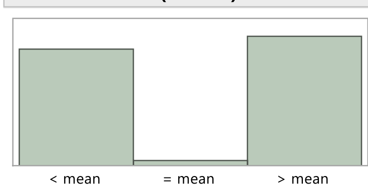
Frequencies

Level	Count	Prob
< median	84908	0.42454
= median	30135	0.15068
> median	84957	0.42479
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

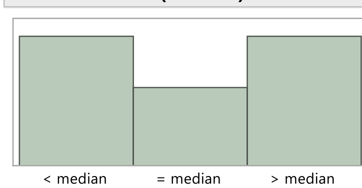


Frequencies

Level	Count	Prob
< mean	93197	0.46599
= mean	2871	0.01436
> mean	103932	0.51966
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



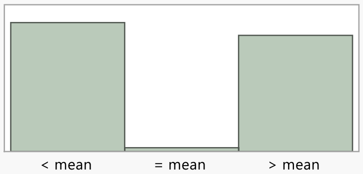
Frequencies

Level	Count	Prob
< median	77022	0.38511
= median	45892	0.22946
> median	77086	0.38543
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

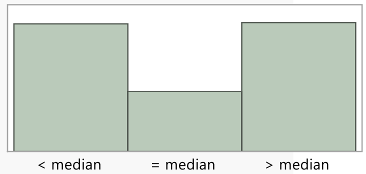


Frequencies

Level	Count	Prob
< mean	104094	0.52047
= mean	1952	0.00976
> mean	93954	0.46977
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



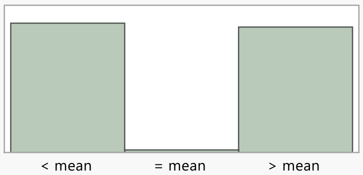
Frequencies

Level	Count	Prob
< median	80953	0.40477
= median	37306	0.18653
> median	81741	0.40871
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

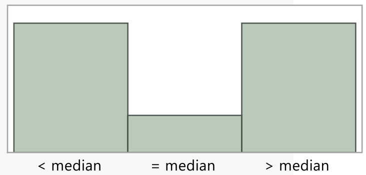


Frequencies

Level	Count	Prob
< mean	101116	0.50558
= mean	1238	0.00619
> mean	97646	0.48823
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



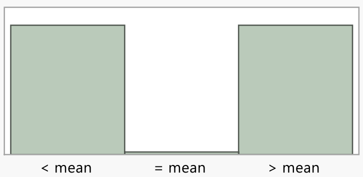
Frequencies

Level	Count	Prob
< median	87584	0.43792
= median	24655	0.12328
> median	87761	0.43881
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

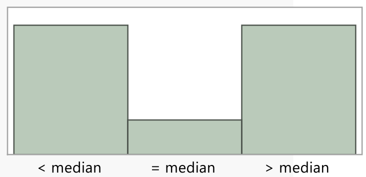


Frequencies

Level	Count	Prob
< mean	99281	0.49641
= mean	1272	0.00636
> mean	99447	0.49724
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



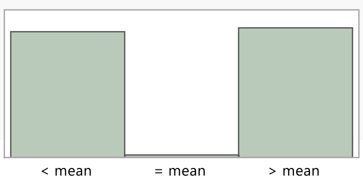
Frequencies

Level	Count	Prob
< median	88526	0.44263
= median	23009	0.11505
> median	88465	0.44233
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

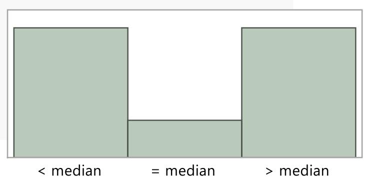


Frequencies

Level	Count	Prob
< mean	97811	0.48906
= mean	1418	0.00709
> mean	100771	0.50386
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



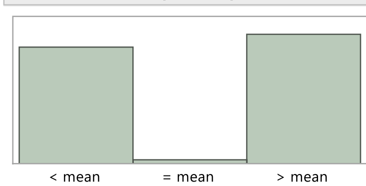
Frequencies

Level	Count	Prob
< median	87644	0.43822
= median	24759	0.12380
> median	87597	0.43799
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

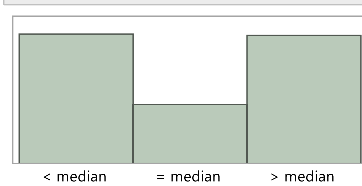


Frequencies

Level	Count	Prob
< mean	94162	0.47081
= mean	1761	0.00881
> mean	104077	0.52039
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



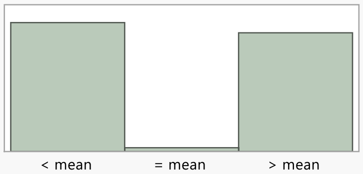
Frequencies

Level	Count	Prob
< median	81924	0.40962
= median	37224	0.18612
> median	80852	0.40426
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

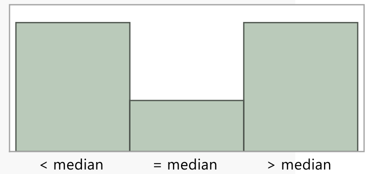


Frequencies

Level	Count	Prob
< mean	103338	0.51669
= mean	1669	0.00835
> mean	94993	0.47497
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



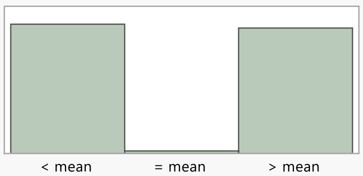
Frequencies

Level	Count	Prob
< median	83488	0.41744
= median	32755	0.16378
> median	83757	0.41879
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

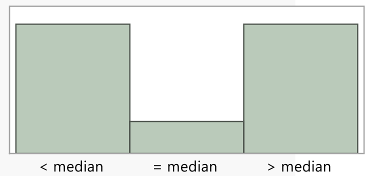


Frequencies

Level	Count	Prob
< mean	100814	0.50407
= mean	1081	0.00541
> mean	98105	0.49053
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



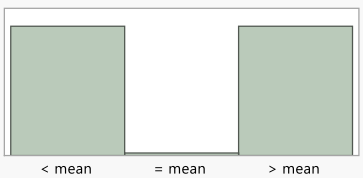
Frequencies

Level	Count	Prob
< median	89208	0.44604
= median	21625	0.10813
> median	89167	0.44584
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

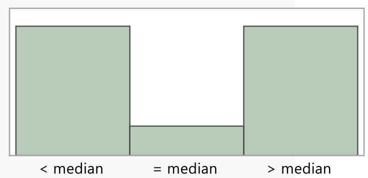


Frequencies

Level	Count	Prob
< mean	99379	0.49690
= mean	959	0.00480
> mean	99662	0.49831
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



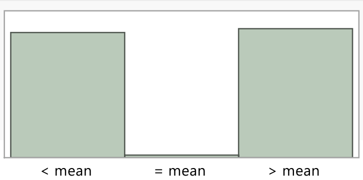
Frequencies

Level	Count	Prob
< median	90207	0.45104
= median	19638	0.09819
> median	90155	0.45078
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

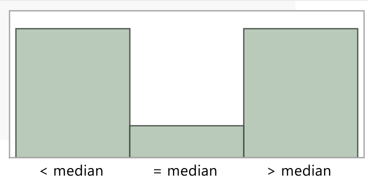


Frequencies

Level	Count	Prob
< mean	98071	0.49036
= mean	1156	0.00578
> mean	100773	0.50387
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



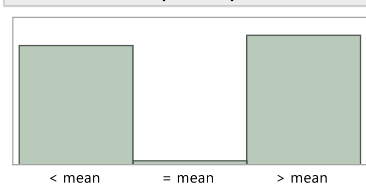
Frequencies

Level	Count	Prob
< median	89270	0.44635
= median	21496	0.10748
> median	89234	0.44617
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)

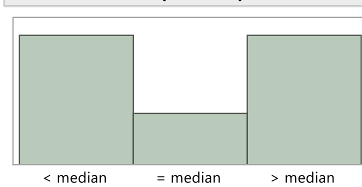


Frequencies

Level	Count	Prob
< mean	95050	0.47525
= mean	1953	0.00977
> mean	102997	0.51499
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



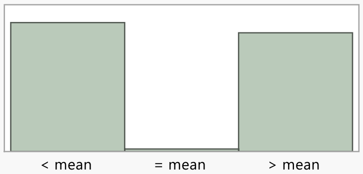
Frequencies

Level	Count	Prob
< median	83891	0.41946
= median	32629	0.16315
> median	83480	0.41740
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

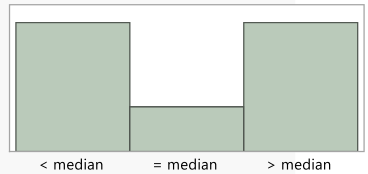


Frequencies

Level	Count	Prob
< mean	103105	0.51553
= mean	1534	0.00767
> mean	95361	0.47681
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



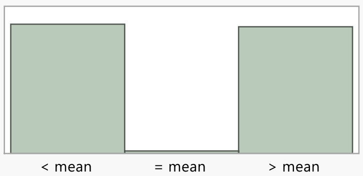
Frequencies

Level	Count	Prob
< median	85101	0.42551
= median	29472	0.14736
> median	85427	0.42714
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

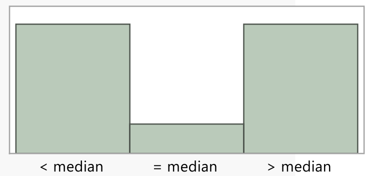


Frequencies

Level	Count	Prob
< mean	100629	0.50315
= mean	1074	0.00537
> mean	98297	0.49149
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



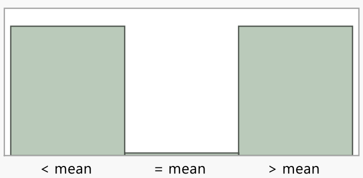
Frequencies

Level	Count	Prob
< median	90382	0.45191
= median	19441	0.09721
> median	90177	0.45089
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)

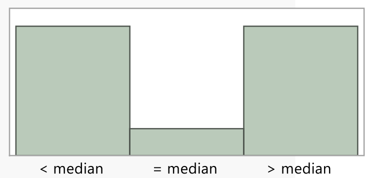


Frequencies

Level	Count	Prob
< mean	99480	0.49740
= mean	992	0.00496
> mean	99528	0.49764
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



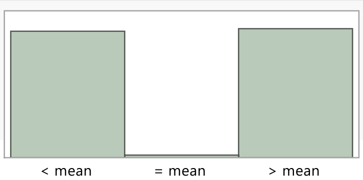
Frequencies

Level	Count	Prob
< median	91077	0.45539
= median	17979	0.08990
> median	90944	0.45472
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

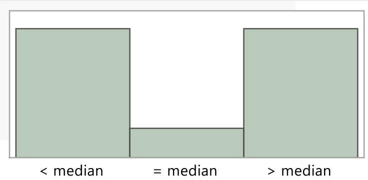


Frequencies

Level	Count	Prob
< mean	98244	0.49122
= mean	1028	0.00514
> mean	100728	0.50364
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



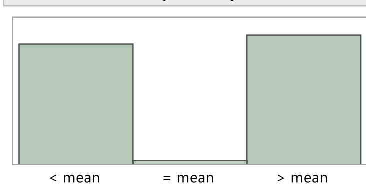
Frequencies

Level	Count	Prob
< median	90107	0.45054
= median	19644	0.09822
> median	90249	0.45125
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=4, Units=20, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

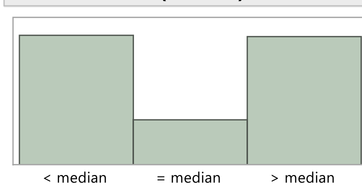


Frequencies

Level	Count	Prob
< mean	95471	0.47736
= mean	1568	0.00784
> mean	102961	0.51481
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



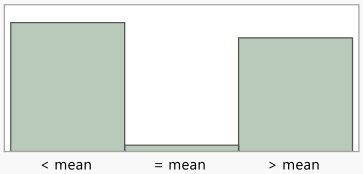
Frequencies

Level	Count	Prob
< median	85591	0.42796
= median	29297	0.14649
> median	85112	0.42556
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=5, Skewness Level=0.1

Data Dominance (S-score)

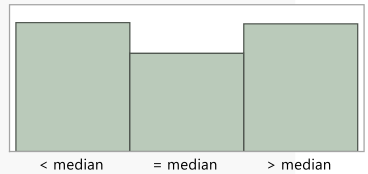


Frequencies

Level	Count	Prob
< mean	104383	0.52192
= mean	4007	0.02004
> mean	91610	0.45805
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



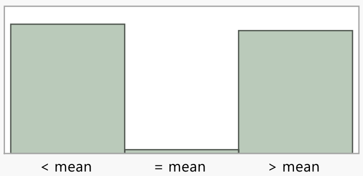
Frequencies

Level	Count	Prob
< median	72504	0.36252
= median	55412	0.27706
> median	72084	0.36042
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=5, Skewness Level=0.3

Data Dominance (S-score)

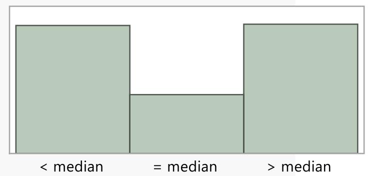


Frequencies

Level	Count	Prob
< mean	101242	0.50621
= mean	2157	0.01079
> mean	96601	0.48301
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



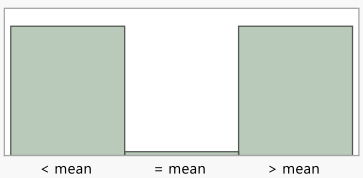
Frequencies

Level	Count	Prob
< median	81252	0.40626
= median	36883	0.18442
> median	81865	0.40933
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=5, Skewness Level=0.5

Data Dominance (S-score)

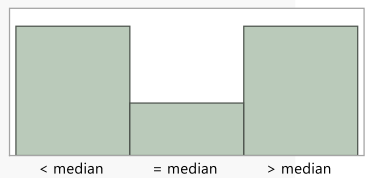


Frequencies

Level	Count	Prob
< mean	99208	0.49604
= mean	1710	0.00855
> mean	99082	0.49541
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



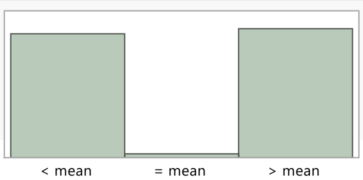
Frequencies

Level	Count	Prob
< median	83209	0.41605
= median	33495	0.16748
> median	83296	0.41648
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=5, Skewness Level=0.7

Data Dominance (S-score)

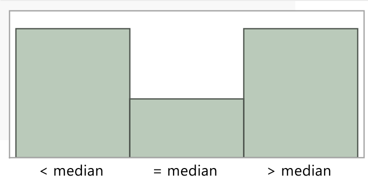


Frequencies

Level	Count	Prob
< mean	96810	0.48405
= mean	1953	0.00977
> mean	101237	0.50619
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



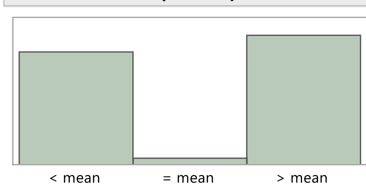
Frequencies

Level	Count	Prob
< median	81819	0.40910
= median	36419	0.18210
> median	81762	0.40881
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=5, Skewness Level=0.9

Data Dominance (S-score)

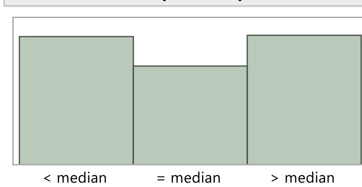


Frequencies

Level	Count	Prob
< mean	91464	0.45732
= mean	3873	0.01937
> mean	104663	0.52332
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



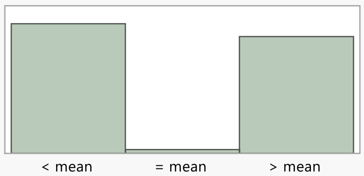
Frequencies

Level	Count	Prob
< median	72202	0.36101
= median	55124	0.27562
> median	72674	0.36337
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=10, Skewness Level=0.1

Data Dominance (S-score)

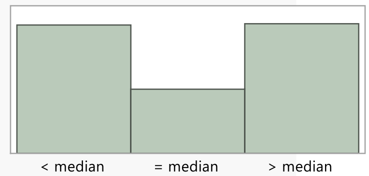


Frequencies

Level	Count	Prob
< mean	103894	0.51947
= mean	2313	0.01157
> mean	93793	0.46897
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



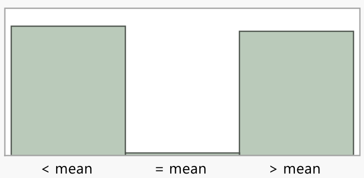
Frequencies

Level	Count	Prob
< median	80194	0.40097
= median	39175	0.19588
> median	80631	0.40316
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=10, Skewness Level=0.3

Data Dominance (S-score)

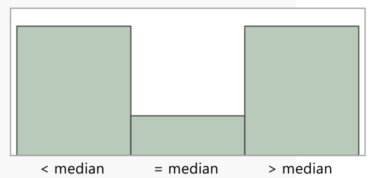


Frequencies

Level	Count	Prob
< mean	101179	0.50590
= mean	1498	0.00749
> mean	97323	0.48662
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



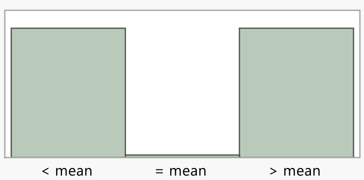
Frequencies

Level	Count	Prob
< median	86850	0.43425
= median	26203	0.13102
> median	86947	0.43474
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=10, Skewness Level=0.5

Data Dominance (S-score)

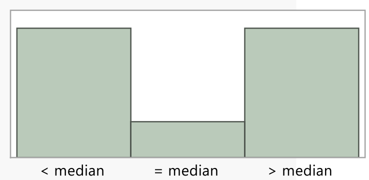


Frequencies

Level	Count	Prob
< mean	99562	0.49781
= mean	1260	0.00630
> mean	99178	0.49589
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



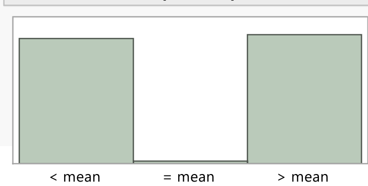
Frequencies

Level	Count	Prob
< median	88223	0.44112
= median	23617	0.11809
> median	88160	0.44080
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=10, Skewness Level=0.7

Data Dominance (S-score)



Frequencies

Level	Count	Prob
< mean	97757	0.48879
= mean	1458	0.00729
> mean	100785	0.50393
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)

Frequencies

Level	Count	Prob
< median	87015	0.43508
= median	26133	0.13067
> median	86852	0.43426
Total	200000	1.00000

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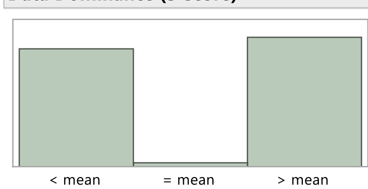
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=10, Skewness Level=0.9

Data Dominance (S-score)

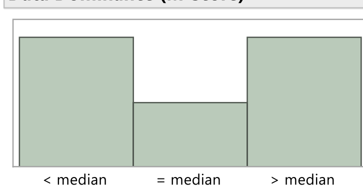


Frequencies

Level	Count	Prob
< mean	94143	0.47072
= mean	2074	0.01037
> mean	103783	0.51892
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



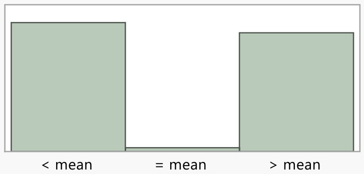
Frequencies

Level	Count	Prob
< median	80401	0.40201
= median	39567	0.19784
> median	80032	0.40016
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=15, Skewness Level=0.1

Data Dominance (S-score)

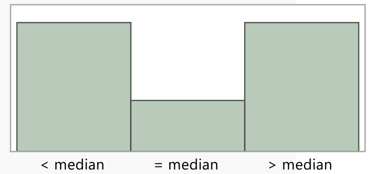


Frequencies

Level	Count	Prob
< mean	103209	0.51605
= mean	1598	0.00799
> mean	95193	0.47597
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



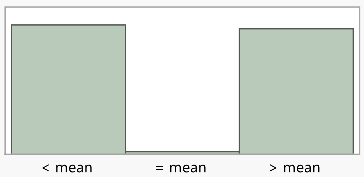
Frequencies

Level	Count	Prob
< median	83580	0.41790
= median	32605	0.16303
> median	83815	0.41908
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=15, Skewness Level=0.3

Data Dominance (S-score)

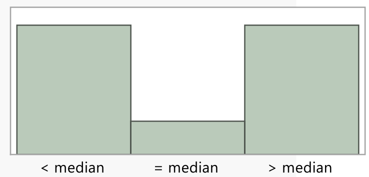


Frequencies

Level	Count	Prob
< mean	100687	0.50344
= mean	1199	0.00600
> mean	98114	0.49057
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



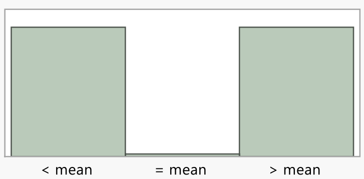
Frequencies

Level	Count	Prob
< median	89039	0.44520
= median	21848	0.10924
> median	89113	0.44557
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=15, Skewness Level=0.5

Data Dominance (S-score)

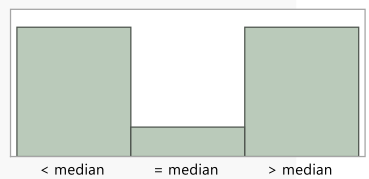


Frequencies

Level	Count	Prob
< mean	99397	0.49699
= mean	1062	0.00531
> mean	99541	0.49771
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



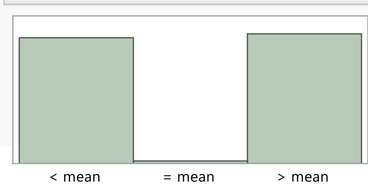
Frequencies

Level	Count	Prob
< median	90052	0.45026
= median	19787	0.09894
> median	90161	0.45081
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=15, Skewness Level=0.7

Data Dominance (S-score)

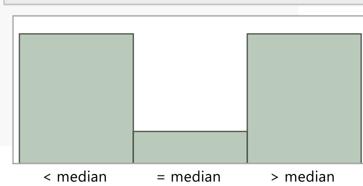


Frequencies

Level	Count	Prob
< mean	98030	0.49015
= mean	1061	0.00531
> mean	100909	0.50455
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



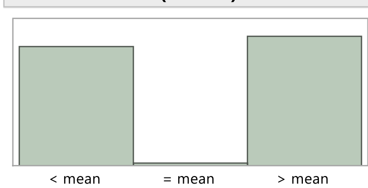
Frequencies

Level	Count	Prob
< median	89274	0.44637
= median	21796	0.10898
> median	88930	0.44465
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=15, Skewness Level=0.9

Data Dominance (S-score)

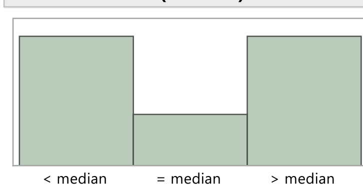


Frequencies

Level	Count	Prob
< mean	95359	0.47680
= mean	1513	0.00757
> mean	103128	0.51564
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



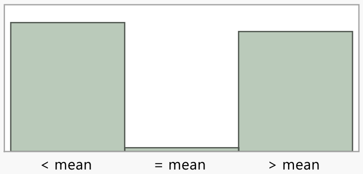
Frequencies

Level	Count	Prob
< median	83947	0.41974
= median	32376	0.16188
> median	83677	0.41839
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=20, Skewness Level=0.1

Data Dominance (S-score)

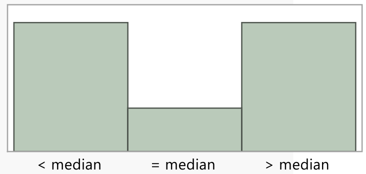


Frequencies

Level	Count	Prob
< mean	102800	0.51400
= mean	1598	0.00799
> mean	95602	0.47801
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



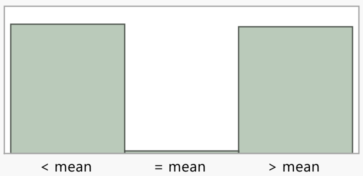
Frequencies

Level	Count	Prob
< median	85584	0.42792
= median	28459	0.14230
> median	85957	0.42979
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=20, Skewness Level=0.3

Data Dominance (S-score)

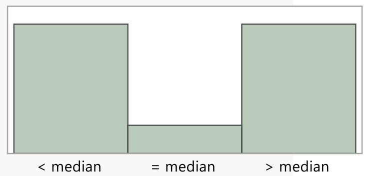


Frequencies

Level	Count	Prob
< mean	100617	0.50309
= mean	1040	0.00520
> mean	98343	0.49172
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



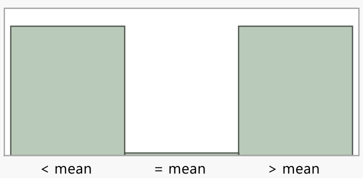
Frequencies

Level	Count	Prob
< median	90709	0.45355
= median	18699	0.09350
> median	90592	0.45296
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=20, Skewness Level=0.5

Data Dominance (S-score)

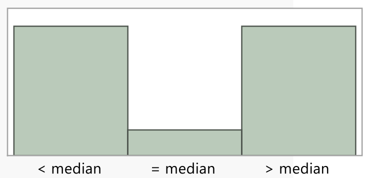


Frequencies

Level	Count	Prob
< mean	99455	0.49728
= mean	944	0.00472
> mean	99601	0.49801
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



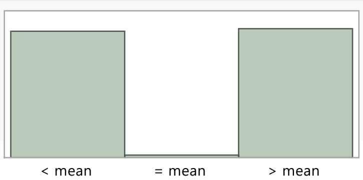
Frequencies

Level	Count	Prob
< median	91371	0.45686
= median	17210	0.08605
> median	91419	0.45710
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=20, Skewness Level=0.7

Data Dominance (S-score)

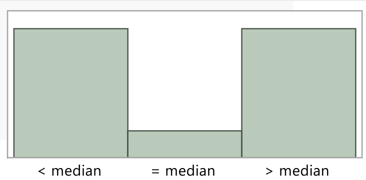


Frequencies

Level	Count	Prob
< mean	98539	0.49270
= mean	1091	0.00546
> mean	100370	0.50185
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



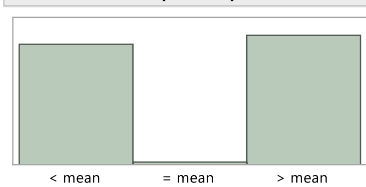
Frequencies

Level	Count	Prob
< median	90762	0.45381
= median	18602	0.09301
> median	90636	0.45318
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=20, Skewness Level=0.9

Data Dominance (S-score)



Frequencies

Level	Count	Prob
< mean	95615	0.47808
= mean	1441	0.00721
> mean	102944	0.51472
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)

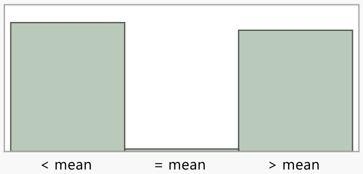
Frequencies

Level	Count	Prob
< median	85849	0.42925
= median	28596	0.14298
> median	85555	0.42778
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=25, Skewness Level=0.1

Data Dominance (S-score)

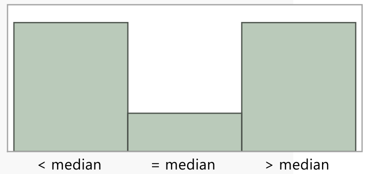


Frequencies

Level	Count	Prob
< mean	102612	0.51306
= mean	1354	0.00677
> mean	96034	0.48017
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



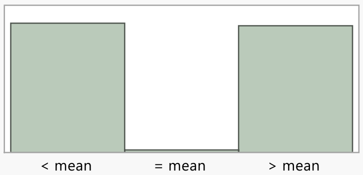
Frequencies

Level	Count	Prob
< median	87107	0.43554
= median	25643	0.12822
> median	87250	0.43625
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=25, Skewness Level=0.3

Data Dominance (S-score)

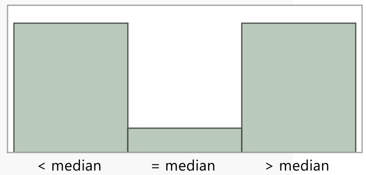


Frequencies

Level	Count	Prob
< mean	100647	0.50324
= mean	837	0.00419
> mean	98516	0.49258
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



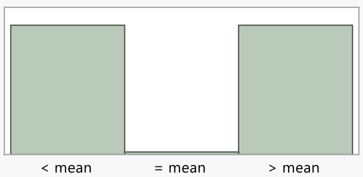
Frequencies

Level	Count	Prob
< median	91525	0.45763
= median	16889	0.08445
> median	91586	0.45793
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=25, Skewness Level=0.5

Data Dominance (S-score)



Frequencies

Level	Count	Prob
< mean	99810	0.49905
= mean	860	0.00430
> mean	99330	0.49665
Total	200000	1.00000

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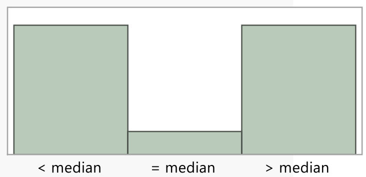
3 Levels

Data Dominance (M-score)



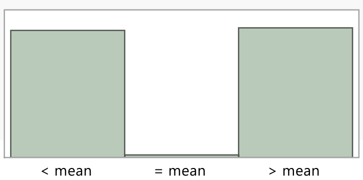
Frequencies

Level	Count	Prob
< median	92263	0.46132
= median	15451	0.07726
> median	92286	0.46143
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=25, Skewness Level=0.7

Data Dominance (S-score)

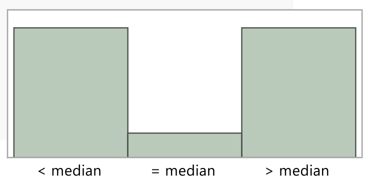


Frequencies

Level	Count	Prob
< mean	98367	0.49184
= mean	822	0.00411
> mean	100811	0.50406
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



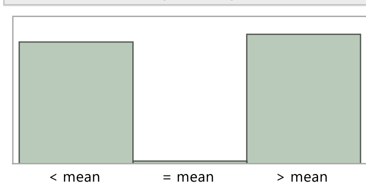
Frequencies

Level	Count	Prob
< median	91533	0.45767
= median	16891	0.08446
> median	91576	0.45788
Total	200000	1.00000

N Missing 0
3 Levels

Distributions - Likert Scale=5, Units=20, Criteria=25, Skewness Level=0.9

Data Dominance (S-score)

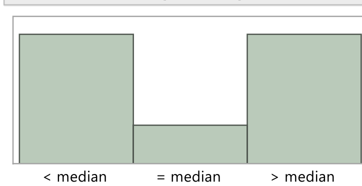


Frequencies

Level	Count	Prob
< mean	96295	0.48148
= mean	1426	0.00713
> mean	102279	0.51140
Total	200000	1.00000

N Missing 0
3 Levels

Data Dominance (M-score)



Frequencies

Level	Count	Prob
< median	87308	0.43654
= median	25537	0.12769
> median	87155	0.43578
Total	200000	1.00000

N Missing 0
3 Levels

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	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	**5d. PROJECT NUMBER**
Low, Tiffany A., Major, USAF	**5e. TASK NUMBER**
	5f. WORK UNIT NUMBER

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23rd Wing Inspector General Inspections 5090 Gardner St, Building 115, Suite 105 Moody AFB, GA 31699 229-257-9352 dustin.mccutcheon@us.af.mil or 23wg.igi@us.af.mil ATTN: TSgt Dustin McCutcheon	**11. SPONSOR/MONITOR'S REPORT NUMBER(S)**

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13. SUPPLEMENTARY NOTES

14. ABSTRACT

The Air Force Inspection System is a proponent of utilizing a risk-based sampling strategy (RBSS) for conducting inspections from major command levels down to the unit level. The strategy identifies areas deemed most important or risky by commanders and prioritizes them accordingly for an independent assessment by the Inspector General. While Air Force regulation specifies the need to use a RBSS for inspection, the implementation process is delegated to individual commands and, subsequently, wings. The 23rd Wing, the sponsor for this research, directed us to analyze a RBSS tool highlighted as an example from which to adopt for those units within Air Combat Command, the major command for the 23rd. Our analysis entailed both descriptive and inferential measures. The results identified some potential shortfalls for which solutions were proposed. The recommended measures include using a median-based metric instead of a mean-based metric to score risk for organizations, a 3-point Likert scale to evaluate criteria, as well as a scoring system for dichotomous criteria when mixing with either a 3-, 4-, or 5-point Likert scale criteria.

15. SUBJECT TERMS
Risk analysis, mean centering, median centering, Likert scales

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