

# Using the PCAT Effectively in Admissions

**AACP Annual Conference  
San Antonio, Texas  
July 9, 2011**



# Agenda

- **Welcome and Introduction**
- **PCAT Computer-Based Test**
- **Interpreting PCAT Scores**
- **Official PCAT Practice Test**
- **PCAT 2012-2013 Blueprint Updates**
- **Admission Feedback**

# PCAT Computer-Based Test

- A computer-based pilot was administered in October 2010 at Pearson VUE testing centers in the United States.
- The results showed that the observed differences between CBT and PPT matched samples were not great enough to require equating.
- All CBT scores were reported as obtained using the same raw-score-to-scaled-score tables as PPT scores.

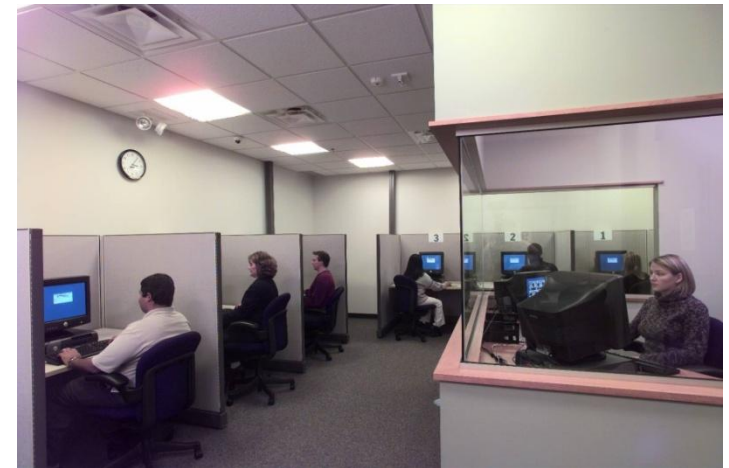
Means, Standard Deviations (SD), and Effect Size Data for CBT and PPT Matched Samples (CBT  $n = 577$ ; PPT  $n = 577$ )

PCAT Subtest	Format	Mean	SD	Min.	Max.	Effect Size
Verbal Ability	CBT	402.3	19.1	330	478	0.008
	PPT	402.5	19.3	351	461	
Biology	CBT	408.5	18.1	333	466	0.019
	PPT	408.9	17.5	363	466	
Reading Comprehension	CBT	396.9	19.7	341	458	0.022
	PPT	397.4	18.7	341	471	
Quantitative Ability	CBT	400.3	14.9	350	457	0.026
	PPT	400.8	15.1	360	457	
Chemistry	CBT	406.2	18.3	356	472	0.019
	PPT	405.7	18.6	360	472	
Conventions of Language	CBT	2.855	0.44	1.5	4	0.021
	PPT	2.867	0.34	1.5	4	
Problem Solving	CBT	2.865	0.42	1	4	0.092
	PPT	2.912	0.31	1	4	

**Note:** CBT = Computer-based test. PPT = Paper-and-pencil-based test. Effect Size = Based on mean differences between samples in terms of standard deviation units (Cohen's  $d$ ). Matched Samples = Sample individuals matched by propensity scores (based on previous PCAT scores and demographic characteristics).

# PCAT Computer-Based Test

- Computer-based testing begins in July 2011 at Pearson VUE Test Centers.
- Candidates will register at [PCATweb.info](http://PCATweb.info) and schedule at [PEARSONVUE.com/PCAT](http://PEARSONVUE.com/PCAT).
- Candidates will receive a preliminary unofficial score report for multiple-choice subtests at the Test Center.
- Multiple-choice subtests and essays will continue to be scored and officially reported by Pearson.



# PCAT Computer-Based Test

PCAT information is available at:

- YouTube videos at [www.youtube.com/PearsonFieldResearch](http://www.youtube.com/PearsonFieldResearch)
- The most up-to-date and comprehensive information can be found in the Candidate Information Booklet (CIB) at [PCATweb.info](http://PCATweb.info) which is available at pharmacy schools and admissions offices.
- CBT testing tutorial available at [PEARSONVUE.com/PCAT](http://PEARSONVUE.com/PCAT)
- Follow us soon on Twitter.

# PCAT Computer-Based Test

- Steps to sign up for the 2011-2012 PCAT are:
- Register at [PCATweb.info](http://PCATweb.info)
- Receive a confirmation email and proceed to schedule preferred testing date, time, and location at [PEARSONVUE.com/PCAT](http://PEARSONVUE.com/PCAT)
- Pearson strongly suggests that candidates register and schedule by the “Register and Schedule By” date to receive preferred testing date, time, and location.
- Confirmation emails with next steps are sent to candidates.
- Security at the Test Centers will include biometric ID, palm vein, digital signature and photo of candidate



# PCAT Computer-Based Test

## Benefits:

- Increased security at Test Centers
- Unofficial Preliminary Score Report given to candidates immediately following test administration
- Scores reported to PharmCAS and pharmacy schools in less time than with paper-and-pencil administration
- Positive feedback from candidates indicates test is user-friendly, and VUE Test Centers provide a comfortable testing environment

# Interpreting PCAT Scores

## Score Reporting

- A personal Official Score Report will be available online at the PCAT website by logging in to the candidate's profile.
- Official Transcripts, showing all PCAT scores earned within the previous five years, are sent to institutions, either printed (via mail) or electronically (via SFTP for Pearson subscribers or via PharmCAS).
- Pharmacy schools receiving paper transcripts receive a summary of all candidates whose scores were sent to their institution.

# Interpreting PCAT Scores

PCAT personal Official Score Reports and Official Transcripts present three types of scores

- Scaled Scores
- Percentile Ranks
- Writing Scores

Neither Pearson nor AACP establishes passing scores for individual PCAT subtests or for the PCAT as a whole. It is the responsibility of each school of pharmacy to determine how it uses PCAT scores.

# Interpreting PCAT Scores

## Scaled Scores

- Range from 200-600, making scores directly comparable across test forms and from year to year
- Reported for the 5 multiple-choice subtests and Composite score

## Percentile Ranks

- Range from 1-99
- Indicate a candidate's performance relative to the current PCAT normative sample (all first-time examinees from October 2004 through May 2007)
- Are provided for each of the 5 multiple-choice subtests and the Composite score

# Interpreting PCAT Scores

## Writing Scores

- Range from 1.0 to 5.0
- Two scores are reported
- Conventions of Language
- Problem Solving
- Both Writing scores represent an average of scores assigned by two scorers.
- For example, a score of 4.5 is the average of one scorer assigning a 4.0 and another scorer assigning a 5.0.

# Interpreting PCAT Scores

## Mean Writing Scores

- The mean Writing scores differ from PCAT test date to test date, reflecting
  - differences in prompt content
  - slight differences in prompt difficulty, and
  - differences in the group of candidates sitting for the PCAT on that test date.
- For this reason, a candidate's Writing scores should always be evaluated relative to the mean scores for the test date on which the scores are earned.

# Interpreting PCAT Scores

## Official Transcript Sample

Most Recent Test Date	PCAT MULTIPLE-CHOICE SCORES							PCAT WRITING SCORES		
	Score	Verbal Ability	Biology	Reading Comp.	Quantitative Ability	Chemistry	Composite		Score	Mean
June 2009	SS	407	392	407	424	446	415	Conventions of Language	4.5	2.90
	PR	60	33	57	79	94	73	Problem Solving	3.5	2.93
Previous Test Dates	PCAT MULTIPLE-CHOICE SCORES							PCAT WRITING SCORES		
	Score	Verbal Ability	Biology	Reading Comp.	Quantitative Ability	Chemistry	Composite		Score	Mean
January 2009	SS	401	390	400	420	440	410	Conventions of Language	3.0	2.92
	PR	50	29	45	74	91	64	Problem Solving	2.5	2.89
August 2008	SS	398	385	396	412	430	402	Conventions of Language	2.0	2.90
	PR	45	22	38	62	85	47	Problem Solving	2.0	2.87

# Interpreting PCAT Scores

## PCAT SSN Reporting

- Pearson believes the practice of identifying candidates using full SSNs is unnecessary and could expose candidates to identity theft in the event data are compromised in any way.
- Pearson is therefore using only the last four SSN digits to identify a candidate.
- The PCAT CID (Candidate ID) is unique and can be used to match candidates.

# Reliability and Validity

## Reliability

- Satisfactory internal consistency for multiple-choice subtest and Composite scores (K-R 20 = 0.80-0.95)
- High inter-rater reliability (0.98 and above) for Writing scores

## Validity

- Intercorrelations among PCAT subtest and Composite scores (2010-11)

PCAT Subtest	Vbl.	Bio.	Rdg.	Quant.	Chem.	Comp.	W: CL
Verbal Ability	—	—	—	—	—	—	—
Biology	0.54	—	—	—	—	—	—
Reading Comprehension	0.67	0.47	—	—	—	—	—
Quantitative Ability	0.33	0.45	0.34	—	—	—	—
Chemistry	0.35	0.57	0.33	0.60	—	—	—
Composite	0.77	0.80	0.74	0.71	0.76	—	—
Writing: Conventions of Language	0.22	0.15	0.24	0.13	0.13	0.23	—
Writing: Problem Solving	0.23	0.17	0.25	0.13	0.13	0.24	0.81

# Reliability and Validity

## Predictive Validity

Correlations Between Predictors and GPA in First Year of Pharmacy Program ( $N = 2,244$ )

Variable	First Year GPA	
	Uncorrected	Corrected
	$r$	$r^*$
PCAT Verbal Ability SS	0.13	0.16
PCAT Biology SS	0.26	0.35
PCAT Reading Comprehension SS	0.17	0.24
PCAT Quantitative Ability SS	0.21	0.28
PCAT Chemistry SS	0.29	0.36
PCAT Composite SS	0.32	0.44
PCAT Writing: Conventions of Language	0.06	
PCAT Writing: Problem Solving	0.06	
Entering GPA: Cumulative	0.44	
Entering GPA: Math	0.28	
Entering GPA: Science	0.44	

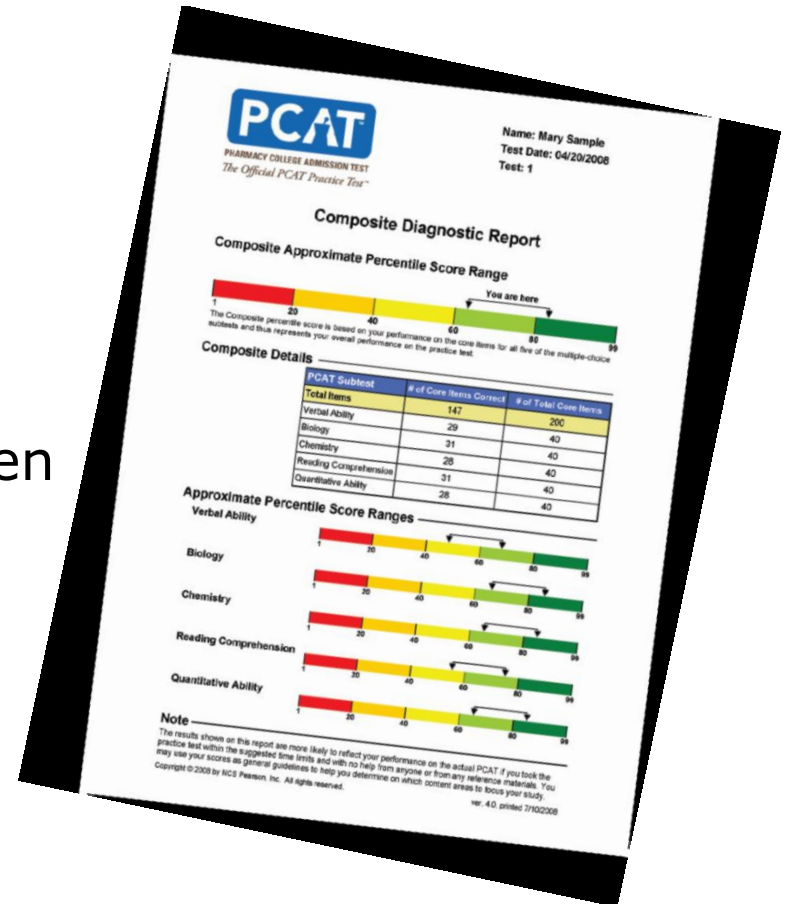
From: Meagher, D. G., Pan, T., & Perez, C. P. (2011). Predicting performance in the first-year of pharmacy school. *American Journal of Pharmaceutical Education*, 75(5), Article 81.

Abbreviations: SS = Scaled Score; GPA = grade point average;  $r$  = correlation coefficient;  $r^2$  = the percent of one variable explainable by another variable

All correlations are weighted means of the correlations for the 22 schools combined based on Fisher's  $z$  transformations; the corrected correlations were done using the formula of Cohen, et al. (2003, p. 58).

# The Official PCAT Practice Test

- Official PCAT Practice Test proven to increase scores
- Examinees who took the Official PCAT Practice Test:
  - Averaged higher on the actual PCAT compared to those who have not taken the Official PCAT Practice Test.
  - Showed a significant increase in their scores on their 2nd attempt of the actual PCAT.



**Diagnostic Report** assesses performance and evaluates strengths and weaknesses by suggesting areas that need review

# Data on PCAT OPT Performance 2010-11

PCAT Subtest/Composite	Prior to 1st Attempt PCAT			
	0 OPT	1 OPT	2 OPTs	3 OPTs
Verbal Ability	401.6	409.8	412.5	414.1
Biology	404.5	413.5	418.2	422.1
Reading Comprehension	397.1	404.1	405.9	408.2
Quantitative Ability	400.9	409.0	416.1	418.6
Chemistry	402.2	414.3	422.6	429.1
Composite	401.3	410.1	415.1	418.4
Writing: Conventions of Language	2.82	2.89	2.87	2.93
Writing: Problem Solving	2.87	2.92	2.89	2.96
<i>n</i>	16,407	738	431	445

**Note:** 0 OPT = cases that took first-attempt PCAT but did not take an OPT first; 1 OPT = cases that took one OPT before taking the first-attempt PCAT; 2 OPTs = cases that took two OPTs before taking the first-attempt PCAT; 3 OPTs = cases that took three OPTs

# PCAT Blueprint

## Current PCAT Blueprint 2011-12

PCAT Subtest	Number of Core Items	Number of Experimental Items	Time Allowed
<b>Part 1: Writing</b>	1 Prompt (either operational or experimental)		<b>30 min.</b>
<b>Part 2: Verbal Ability</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
Analogies	25	5	
Sentence Completion	15	3	
<b>Part 3: Biology</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
General Biology	25	4-5	
Microbiology	7-8	1-2	
Anatomy & Physiology	7-8	1-2	
<b>Part 4: Chemistry</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
General Chemistry	25	5-6	
Organic Chemistry	15	2-3	
<b>Rest Break</b>			<b>Variable</b>
<b>Part 5: Writing</b>	1 Prompt (either operational or experimental)		<b>30 min.</b>
<b>Part 6: Reading Comprehension</b>	<b>40 / 5 passages</b>	<b>8 / 1 passage</b>	<b>50 min.</b>
Comprehension	12-13	2-3	
Analysis	15	3-4	
Evaluation	12-13	2-3	
<b>Part 7: Quantitative Ability</b>	<b>40</b>	<b>8</b>	<b>40 min.</b>
Basic Math	5-6	1-2	
Algebra	7-8	1-2	
Probability & Statistics	7-8	1-2	
Pre-Calculus	9-10	2-3	
Calculus	9-10	2-3	
<b>Total Test</b>	<b>200 multiple-choice items + 1 writing prompt</b>	<b>40 multiple-choice items + 1 writing prompt</b>	<b>240 min. = 4 hrs. + Rest Break</b>

## New PCAT Blueprint 2012-13

PCAT Subtest	Number of Core Items	Number of Experimental Items	Time Allowed
<b>Part 1: Writing</b>	1 Prompt (either operational or experimental)		<b>30 min.</b>
<b>Part 2: Verbal Ability</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
Analogies	25	5	
Sentence Completion	15	3	
<b>Part 3: Biology</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
General Biology	20-22	4-5	
Microbiology	7-8	1-2	
Anatomy & Physiology	12-13	2-3	
<b>Part 4: Chemistry</b>	<b>40</b>	<b>8</b>	<b>30 min.</b>
General Chemistry	20-22	4-5	
Organic Chemistry	12-13	2-3	
Basic Biochemistry Processes	7-8	1-2	
<b>Rest Break</b>			<b>Variable</b>
<b>Part 5: Writing</b>	1 Prompt (either operational or experimental)		<b>30 min.</b>
<b>Part 6: Reading Comprehension</b>	<b>40 / 5 passages</b>	<b>8 / 1 passage</b>	<b>50 min.</b>
Comprehension	12-13	2-3	
Analysis	14-15	3-4	
Evaluation	12-13	2-3	
<b>Part 7: Quantitative Ability</b>	<b>40</b>	<b>8</b>	<b>40 min.</b>
Basic Math	5-6	1-2	
Algebra	7-8	1-2	
Probability & Statistics	7-8	1-2	
Pre-Calculus	9-10	2-3	
Calculus	9-10	2-3	
<b>Total Test</b>	<b>200 multiple-choice items + 1 writing prompt</b>	<b>40 multiple-choice items + 1 writing prompt</b>	<b>240 min. = 4 hrs. + Rest Break</b>

# PCAT Blueprint 2012-13

Biology (approximate percentages for each content objective)

<b>Biology Content</b>	<b>2011 – 2012</b>	<b>2012 – 2013</b>
<b>General Biology</b>	<b>60%</b>	<b>50%</b>
<b>Cellular and Molecular Biology</b>	<b>15%</b>	<b>17%</b>
<b>Diversity of Life Forms</b>	<b>15%</b>	<b>17%</b>
<b>Ecology</b>	<b>5%</b>	<b>—</b>
<b>Plants, Algae and Fungi</b>	<b>5%</b>	<b>—</b>
<b>Animals</b>	<b>10%</b>	<b>—</b>
<b>Health</b>	<b>10%</b>	<b>17%</b>

<b>Microbiology</b>	<b>20%</b>	<b>20%</b>
Microorganisms	4%	4%
Infectious Diseases & Prevention	4%	4%
Microbial Ecology	4%	4%
Medical Microbiology	4%	4%
Immunity	4%	4%
<b>Anatomy and Physiology</b>	<b>20%</b>	<b>30%</b>
Structure	8%	12%
Systems	12%	18%

# PCAT Blueprint 2012-13

<b>Chemistry Content</b>	<b>2011 – 2012</b>	<b>2012 – 2013</b>
<b>General Chemistry</b>	<b>60%</b>	<b>50%</b>
Atomic Theory	8%	8%
Chemical Bonding	8%	8%
Reactions and Reaction Mechanisms	15%	14%
Kinetic Theory	8%	8%
Solutions	8%	8%
Basic Organic Chemistry	8%	—
Nuclear Chemistry: Radioisotopes	5%	4%

Chemistry (approximate percentages for each content objective)

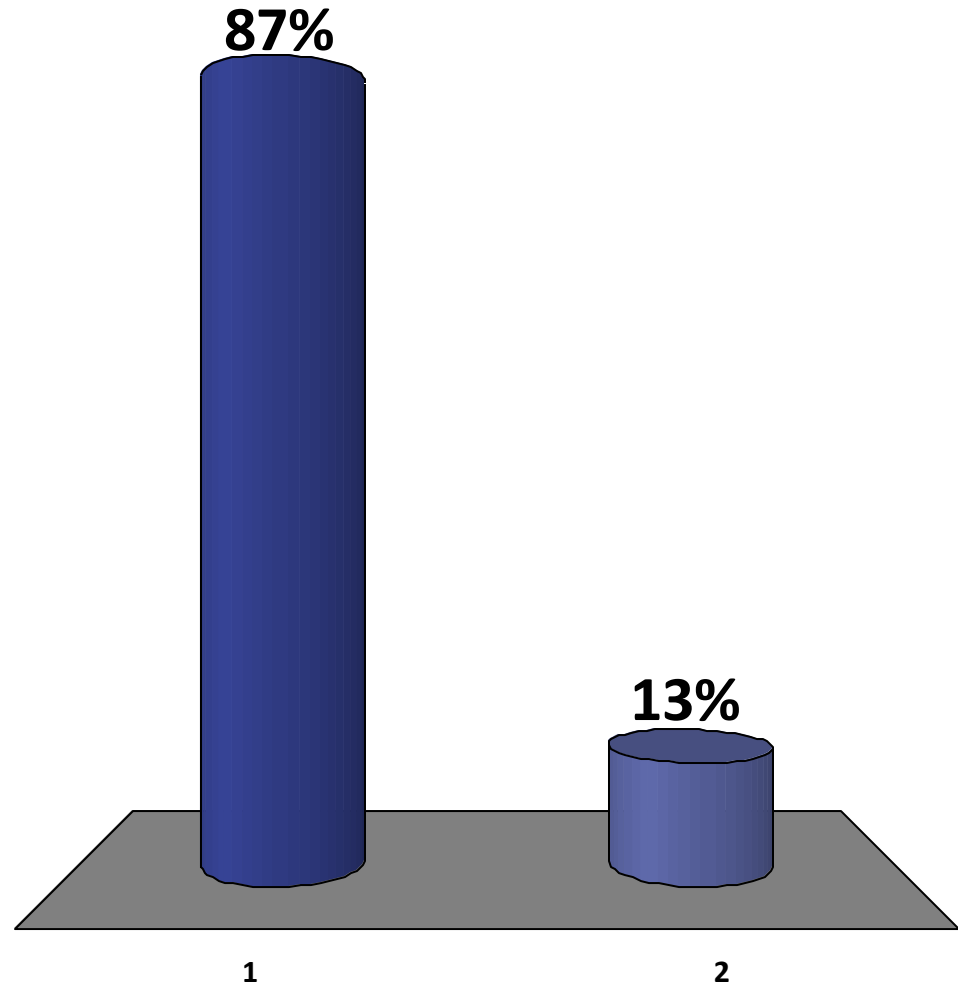
<b>Organic Chemistry</b>	<b>40%</b>	<b>32%</b>
Structure and Properties	20%	16%
Reactions of Organic Compounds	20%	16%
<b>Basic Biochemistry Processes</b>	—	<b>18%</b>
DNA and RNA	—	6%
Lipids	—	6%
Proteins	—	6%

# Admission Feedback

**1. Do you currently use PCAT scores?**

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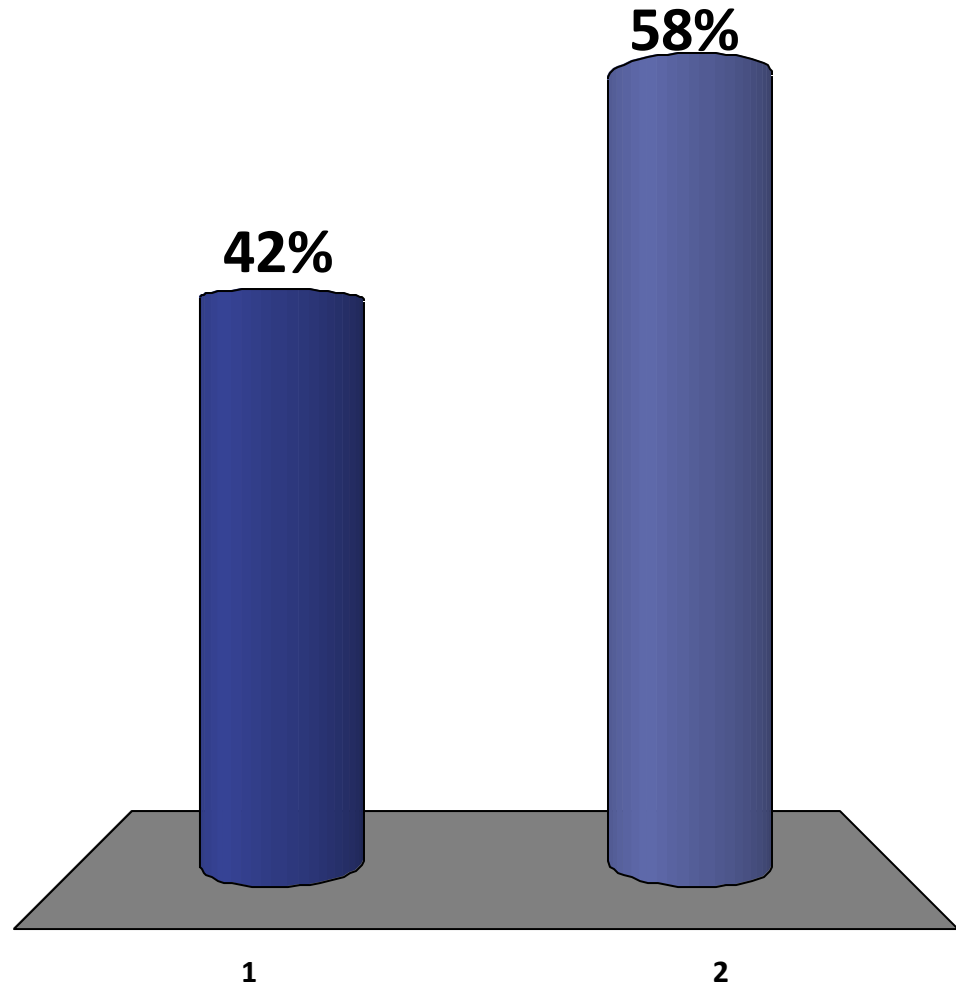
- 1. Yes
- 2. No



**2. If you are currently using PCAT scores, are you satisfied that the current scores adequately reflect candidates' skills and abilities?**

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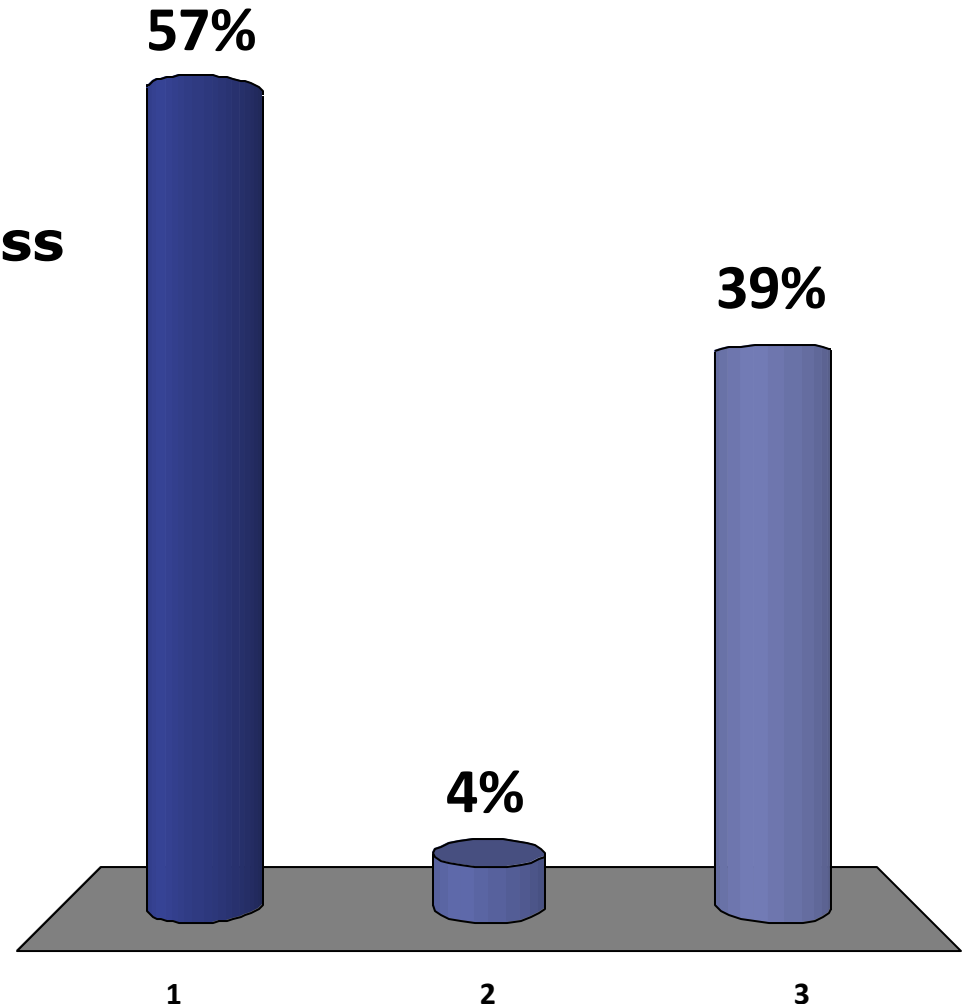
1. Yes
2. No



**3. Do you currently or would you like to be able to assess applicants' humanistic behavioral characteristics as part of your program's admissions process?**

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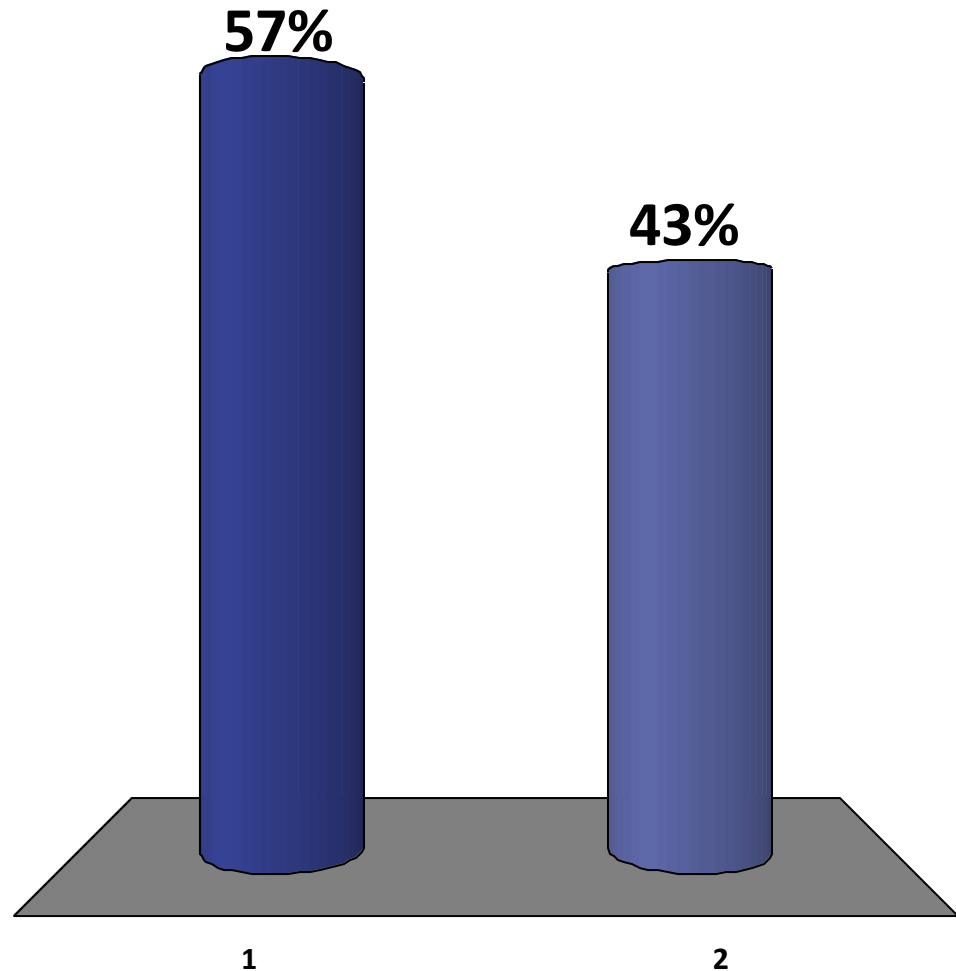
1. Yes, I do currently.
2. No, not interested.
3. No, but would like to assess in the future.



**4. Would the addition of a PCAT score reflecting candidates' knowledge of behavioral and social science content be of value?**

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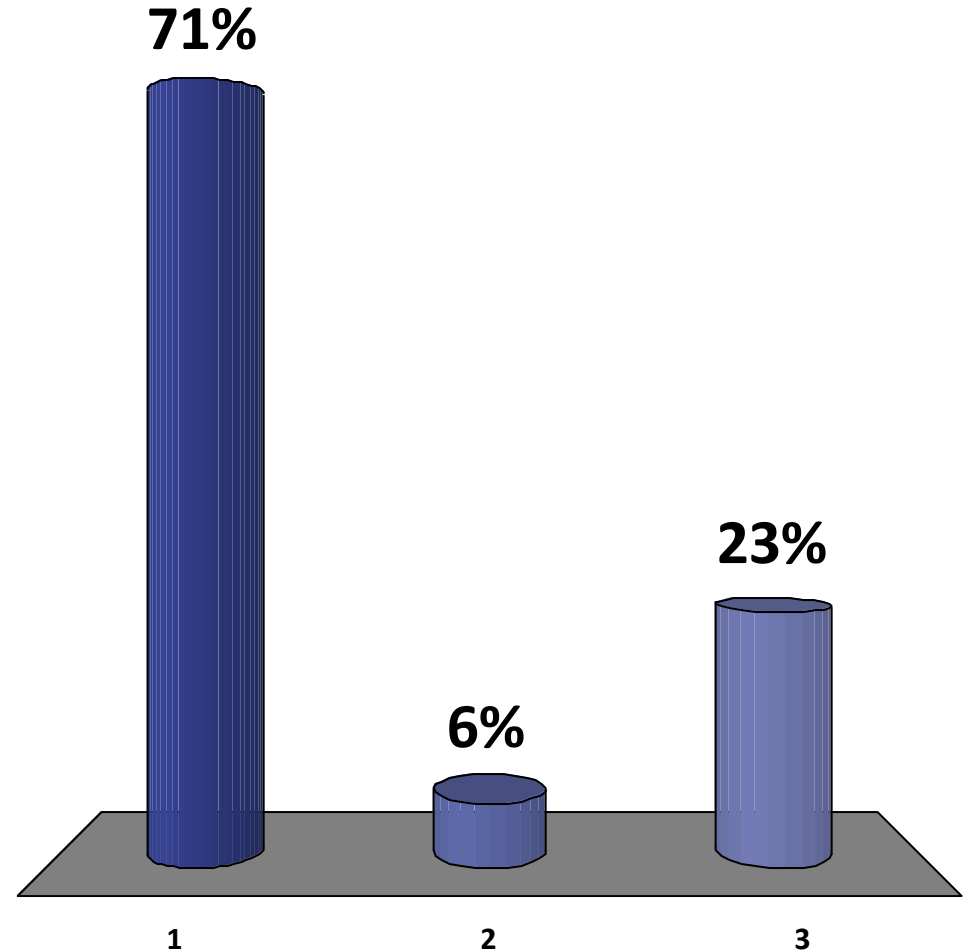
1. Yes
2. No



## **5. Would an assessment of candidates' humanistic behavioral characteristics separate from the PCAT be of value?**

## 5. Would an assessment of candidates' humanistic behavioral characteristics separate from the PCAT be of value?

1. Yes, this would be of value
2. No, this would not be of value
3. Uncertain



# Additional Comments?

# Reference Links

## PCAT Technical Manual and PCAT Score Interpretation Quick Reference

[www.aacp.org/resources/academicpolicies/admissionsguidelines/Pages/PharmacyCollegeAdmissionsTest.aspx](http://www.aacp.org/resources/academicpolicies/admissionsguidelines/Pages/PharmacyCollegeAdmissionsTest.aspx)

## PCAT Website

[www.PCATweb.info](http://www.PCATweb.info)

## PCAT Validity Study published in AJPE

[www.aacp.org/resources/academicpolicies/admissionsguidelines/Documents/PCATPredictiveValidityStudy--GeneralReport.pdf](http://www.aacp.org/resources/academicpolicies/admissionsguidelines/Documents/PCATPredictiveValidityStudy--GeneralReport.pdf)

[www.ajpe.org/aj7sos/aj750581.pdf](http://www.ajpe.org/aj7sos/aj750581.pdf)

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