

VIC Schield 2020 ASA Slides 1

Statistical Literacy: Scanlan's Paradox

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ISLP: Encouraging a Critical Mindset on Social Statistics
Paper: www.StatLit.org/pdf/2020-Schild-ASA.pdf
www.StatLit.org/pdf/2020-Schild-ASA-Slides.pdf
www.StatLit.org/V/2020-Schild-ASA-Slides-Audio.mp4

VIC Schield 2020 ASA Slides 2

Scanlan's Paradox

Scanlan's Paradox: Lowering 'bad' rates for two groups generally increases their disparity ratio. Agencies are being required to lower rates of bad things: suspensions, birth defects, poverty, etc. If blacks are more likely to encounter these bad results, reducing these bad rates tends to increase the black-white disparity ratio. When this happens, agencies are criticized for their negative results. People may be fired – unaware that the increase in the disparity ratio is predictable.

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Racial Suspension Disparities in St. Paul Schools

Black students were expelled or suspended **6.2 times** as often as white students at St. Paul schools.

A third of all Minnesota school exclusions are for minor incidents: talking back, eye rolling or swearing. St. Paul staff "took racial equity training, the district narrowed the types of behaviors that were to result in suspension, and principals were instructed to keep kids in class when possible."

<https://www.twincities.com/2018/06/29/st-paul-schools-to-scrutinize-student-suspensions-under-human-rights-agreement/>

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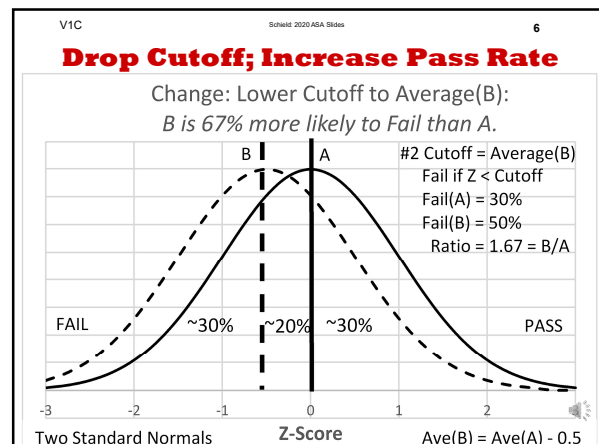
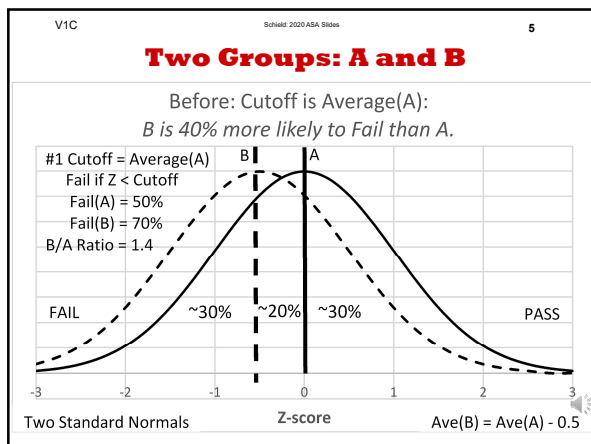
Scanlan's Paradox

Good news! The results!
Suspensions down: blacks cut 37%; whites cut 44%.

But ... racial disparities increased.

Black-white ratio of suspensions up from 6.2 to 7.6!
Blacks almost 8 times as likely to be suspended as whites.

This is **Scanlan's paradox**:
Making some things better makes other things worse.



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Disparity Ratio: Closer to 1 is the goal

Fail Rate	Z < Ave(A)	Z < Ave(B)	Change	Result		Decrease Failing
A	50%	30%	-40%	A better	1	
B	70%	50%	-29%	B better	2	
Ratio B/A	1.4	1.7	19%	B worse	3	

Increase Passing	Pass Rate	Z > Ave(A)	Z > Ave(B)	Change	Result	
	A	50%	70%	40%	A better	4
	B	30%	50%	67%	B better	5
	Ratio B/A	0.60	0.71	19%	B better	6

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Scanlan Rules: As rates decreases ...

Scanlan: "the less prevalent the condition, the ..."

- "greater the disparity in experiencing the condition"
- "larger will be the proportion of those experiencing the condition [that are] comprised by the more susceptible group."

Schild: As a condition becomes rarer, the bigger the ...

- ... relative difference (disparity ratio).
- ... share of the more susceptible [among susceptible].

Paradox: Making things absolutely better for both groups can make things relatively worse for one group.

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Decrease Infant Death Rates: Blacks Worse Off (Relatively)

US Infant Mortality Rate (Death per 1,000 live births)					Decrease Mortality
	1983	1997	Change	Result	
White	10	6	-38%	W better	
Black	19	14	-26%	B better	
Ratio B/W	2.0	2.4	20%	B worse	

US Infant Survival Rate (Survivors per 1,000 live births)					Increase Survival
	1983	1997	Change	Result	
White	990	994	0.4%	W better	
Black	981	986	0.5%	B better	
Ratio B/W	0.990	0.992	0.1%	B better	

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Reduce the Poverty Rate: Blacks Worse Off (Relatively)

US Poverty Rate (Income below ↓ Poverty Level)					Decrease Below-Poverty
	1990	\$ < 100%*	\$ < 50%**	Change	Result
White	11%	4%	-64%	W better	
Black	32%	14%	-55%	B better	
Ratio B/W	3.0	3.7	24%	B worse	

* Income below 100% (** 50%) of the poverty line

US Poverty-Avoided Rate (Above ↑ Poverty Rate)					Increase Above-Poverty
	1990	\$ > 100%*	\$ > 50%**	Change	Result
White	89%	96%	8%	W better	
Black	68%	86%	26%	B better	
Ratio B/W	0.76	0.89	17%	B better	

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Formal Cause: Confounding

Suppose 20% of B failed (10% of A): a **2:1 B-A ratio**.

- If A failures are cut in half, the ratio increases: 4:1.
- If B failures are cut in half, the ratio decreases: 1:1.
- If both are cut in half, the ratio is unchanged: 2:1.

The change in the disparity ratio is determined by whether the rates are cut proportionately.

Confounding: The relationship between the rate cuts and the change in the disparity ratio is confounded by the size of the rate cuts relative to the size of the initial rates.

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Conclusion

As society eliminates bad things, we can expect:

- the more susceptible group is increasingly subject to the bad thing – relative to the less susceptible group.
- the more susceptible group to be an increasing share of those experiencing the bad outcome.
- the improvements in – and the differences between – the good things to become smaller.

Scanlan's paradox

- is socially (journalistically) significant
- should be in statistical literacy (social statistics) courses

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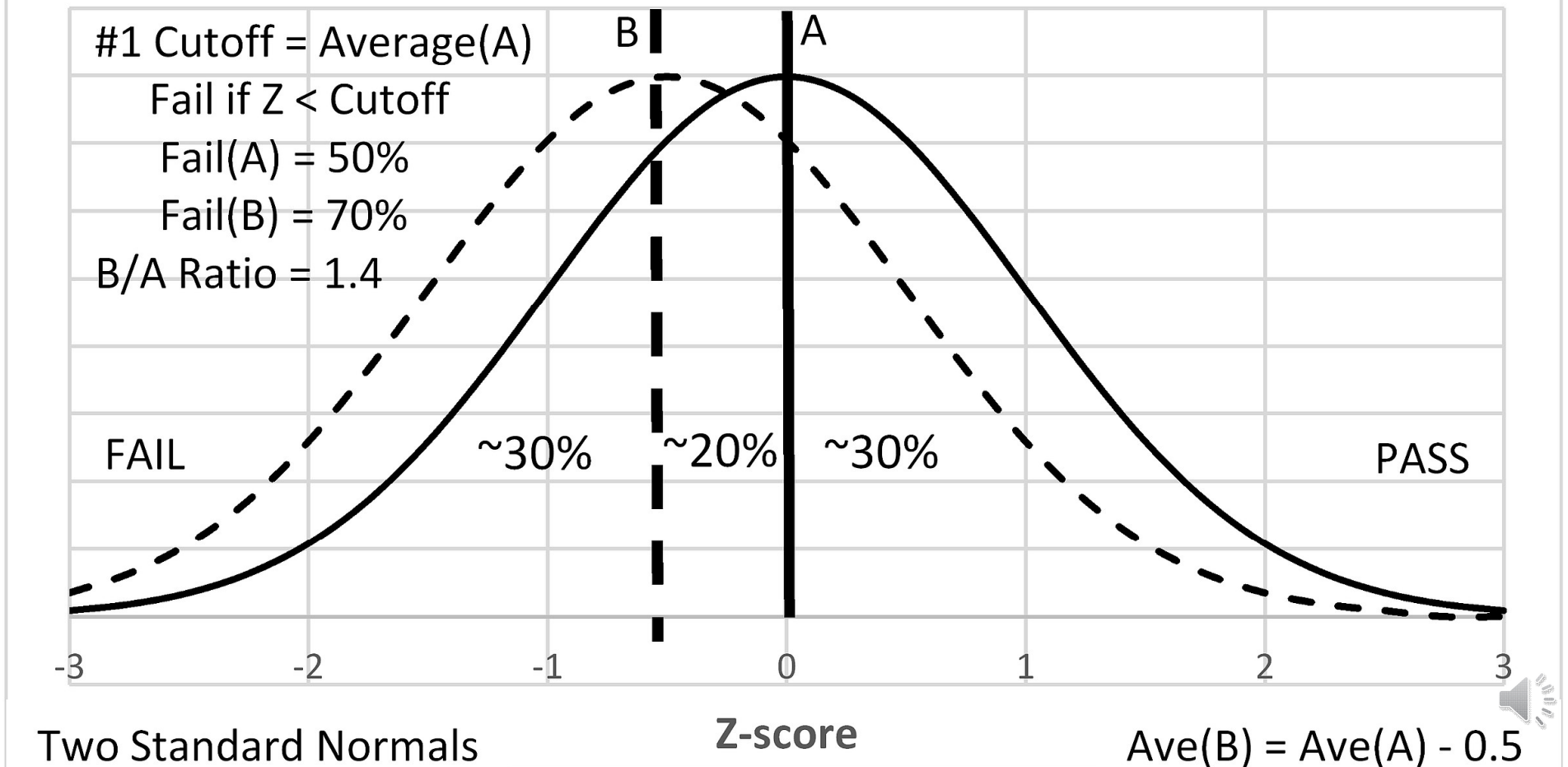
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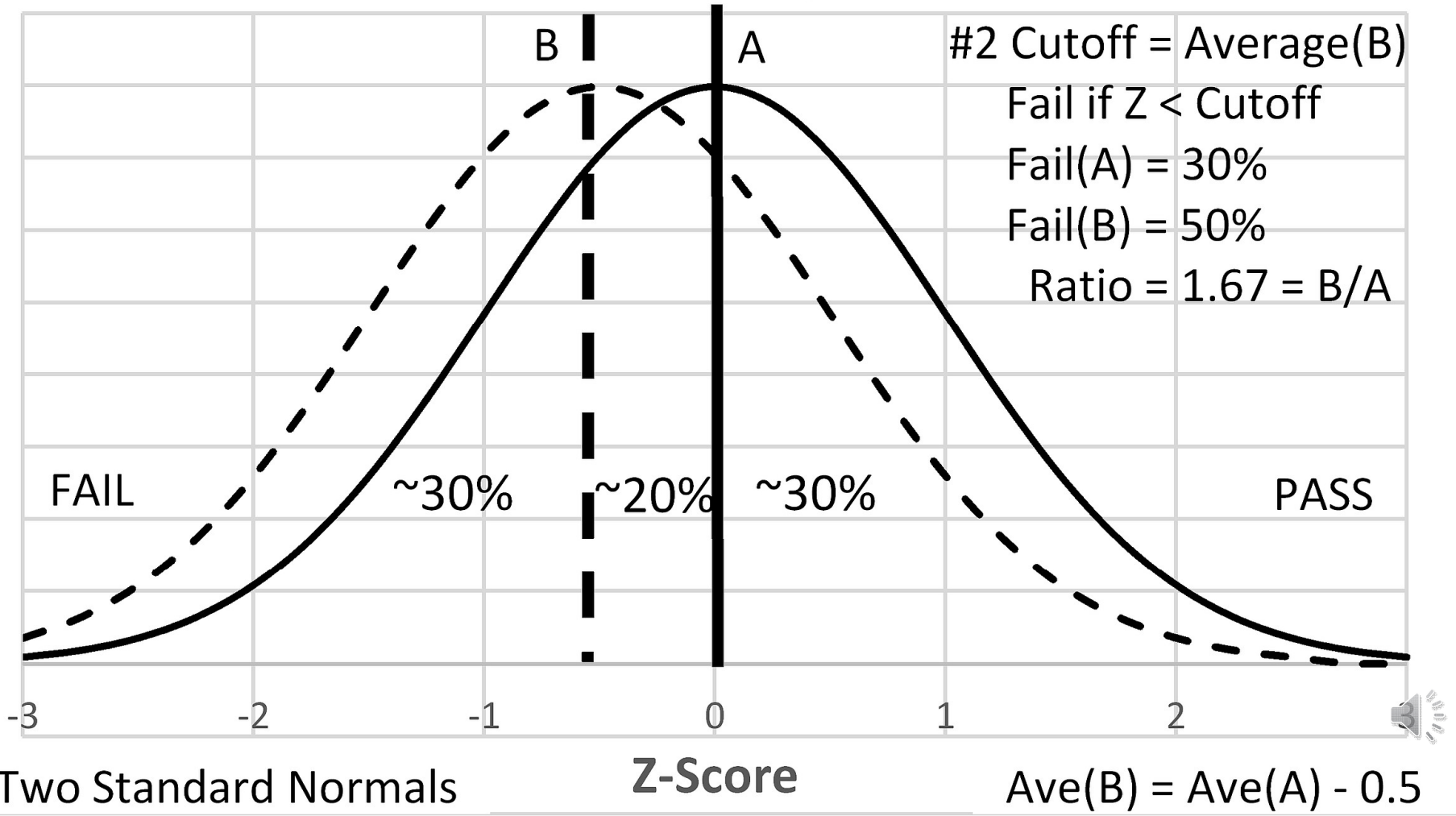
Two Groups: A and B

Before: Cutoff is Average(A):
B is 40% more likely to Fail than A.



Drop Cutoff; Increase Pass Rate

Change: Lower Cutoff to Average(B):
B is 67% more likely to Fail than A.



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Decrease
Mortality

Increase
Survival

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