Subject: A/B Testing/Weber Fachner Law
Posted by Manualblock on Tue, 14 Jun 2005 14:24:39 GMT
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In the process of reading through some IRE journals in an attempt to gain some understanding regarding AB testing I have come across the mention of this phenomena several times. Does anyone know if it is genuine and if so what impact this effect may have on testing modalities?

Subject: Re: A/B Testing/Weber Fachner Law
Posted by Mr Vinyl on Tue, 14 Jun 2005 14:57:19 GMT
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Hi, I know nothing of this law but a quick goggle search came up with the following. There were many other sites found. You might want to try a search on goggle. It's spelled "Weber-Fechner Law"
http://www.absoluteastronomy.com/encyclopedia/W/We/Weber-Fechner_Law1.htm

Subject: Re: A/B Testing/Weber Fachner Law
Posted by Manualblock on Tue, 14 Jun 2005 16:54:29 GMT
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Thanks Mr V thats an excellent place to start. This is one of the quotes from the audio field circa 1954;" The increase of a stimulus neccessary to produce a just discernible increase in the resulting sensation bears a constant ratio to the total stimulus. It is sometimes stated in the form that the magnitude of the sensation produced is proportional to the logarithum of the stimulus. This law applied to the hearing sensation means a fractional increase in intenstity, which is just perceptable as a change in intensity; should be a constant independent of the intensity." I have not seen this made public yet by the AB posts; yet it seems pretty critical to any test involving the ABX format.What gives?

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Tue, 14 Jun 2005 23:00:18 GMT
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This is why the volume levels are to be held constant in any A/B test. It's also why I don't consider power increases less than 2x to be particularly significant. If you A/B test two things with 10% difference, you'll surely hear it and the louder one has a slight advantage. But if you're not A/B

testing, you really have to double power to notice much of a change. A ten percent increase seems like almost nothing at all, barely perceptible unless compared side-by-side.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Wed, 15 Jun 2005 00:04:40 GMT
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I see your point regarding level matching as it seems that would also affect the amps and distortion and overload conditions and every other aspect of reproduction. Is that the sum total of what they mean here though?The couple of papers I have encountered this mentioned it was used to describe quality issues as the variable while the operating conditions were held stable; that is the part I found curious. Looking at Mr Vinyls link they say for instance that humans hear Pitch Distance in a logarithmic fashion, ie the distance between 100hz and 150hz sounds the same as the difference between 1000hz and 1500hz.One article mentions transient overload in the output stage of a PP amp and conditions that skewed the AB results.Just something to mull over. Looks interesting though.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Wed, 15 Jun 2005 06:11:39 GMT
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In the musical scales most of us are familar with, there are twelve half-notes per octave. Each half-note is separated by a factor of 21/12, approximately a 1.06-to-1 ratio. The math behind musical scales is very interesting. Check out these links:Musical Scales - Subdivision of the octaveChromatic ScaleDiatonic ScaleMore about the Diatonic Scale

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Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Wed, 15 Jun 2005 11:58:25 GMT
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Absolutely; that is one of the points they make on the site, they include the formula for determining all of the relationships between tones. What I don't follow is how that phenomena affects reaction to percieved quality of sound. That seems to be the sticking point as this Weber-Fechner Law modulates all results. I only bring it up as it appeared in a couple articles on testing and I had never heard reference made to the effects it might have in any of the current literature.Its new to me also.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Wed, 15 Jun 2005 12:05:14 GMT
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It's definitely interesting stuff. I took piano lessons for seven years when I was a kid, and I played synthesizers when they were analog. So I studied musical scales and note and chord progressions and also waveforms, harmonics, attack and decay and that kind of thing. It's holistic and reductionistic at the same time; There is art and mathematics intertwined in the most interesting way.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Wed, 15 Jun 2005 17:16:21 GMT
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Wayne my friend; I must apologise for my inability to properly communicate on this issue. I really appreciate that you are willing to pursue this and regret that we seem to have become sidetracked here. While it is a good discussion and enjoyable we have not addressed the issue of the post at all.See this statement of the Weber-Fechner Law is not addressed specifically to sound or audio. It is a consequence of pshycological response to external stimuli as far as I can tell. One way I found it too be expressed is that in comparison testing the two options at test and the control are governed by the perception of difference in as much as people will always choose the option that is most close in quality to the last choice. If there are any differences, and that is what the test seeks to prove, then the proximity of the choice will determine the outcome.This was considered the fundamental flaw in all comparison testing and as a result caused many of those types of tests to be suspect or abandoned.Would you agree with this understanding; or am I not getting the meaning of this theory? Please understand this is my interpretation of the process; it is not an opinion I found somewhere.Thanks for offering your valuable insights into this.

Subject: Re: A/B Testing/Weber Fachner Law
Posted by akhilesh on Wed, 15 Jun 2005 17:24:12 GMT
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Nice Link, Mr. Vinyl, and thanks for bringing this topic up John. What it tells me is that improvements in audio reproduction beyond a certain point suffer from dimininshing marginal returns, so an AB testing of high quality equipment will usually lead to a significant null result.
-akhilesh

Subject: Re: A/B Testing/Weber Fachner Law

Posted by Manualblock on Wed, 15 Jun 2005 23:18:24 GMT
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Very true; or a result that just reflects a difference not neccessarily an improvement. One of the aspects of this theory says that any individual exposed to a test that requires a positive or negative reaction will always feel impelled to give a reaction of some sort whether or not there is a percieved difference. Statistically there is a low incidence of null outcomes due to this effect.So; even if you hear no discernable change you still feel as if there is a change in order to justify your participation in the test.Thats the pschycological payback.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Thu, 16 Jun 2005 06:27:31 GMT
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You know, I've noticed that as well, especially in audio because of a sort of "Emporer's New Clothes" kind of thing. Sometimes, two components sound and measure exactly the same, but if one is significantly more expensive, it seems that people want to appear "golden eared" enough to hear it. It's like audio peer pressure or something. I find it refreshing to find people who are confident enough to admit when they don't hear a difference.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Thu, 16 Jun 2005 06:36:31 GMT
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I see what you mean. It is sort of like the comparison sets a standard to be judged against. If people tend to like a certain thing, then compared items may be judged unfavorably even if superior. So if, for example, three sound systems have midrange bloom and a fourth has much truer response, it might be judged to be inferior by most people, simply because it was noticeably different. That's an intersting observation, and I can see it in people's resistance to change, even if the change is good.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Thu, 16 Jun 2005 11:39:59 GMT
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Thats it. Thats how I read it. My question is whether this is a consideration when formulating comparison tests and why it is not mentioned in those types of discussions.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Thu, 16 Jun 2005 12:05:49 GMT
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Good point; Definitely something to consider. I wonder how it could be addressed.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Thu, 16 Jun 2005 12:55:19 GMT
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Actually I brought it up assuming it was a well known phenomena; possibly discredited or already accounted for in some way. I thought I would get an explanation of why it did not matter or if not, then how it was implemented. So; who knows.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Thu, 16 Jun 2005 14:43:10 GMT
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I agree with the golden ear syndrome but I think in this case where the objects understudy have their identities masked that would not apply.I went to a meeting of the Audio Society and at the time I had my E.A.R at the shop for routine maintainence. When the part of the meeting came and we were asked to speak about our components I said I was using my Dyna ST 70 as an amp.You would have thought I said I had cancer; the looks of sympathy and the heads lowered was comical. Meanwhile the ST 70 sounded better and more musical than some of the expensive stuff demoed there.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Wayne Parham on Thu, 16 Jun 2005 15:08:02 GMT
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That's funny. It's like showing up at a Mini-Cooper ralley with a 1965 AC Cobra.

Subject: Re: A/B Testing/Weber Fechner Law
Posted by Manualblock on Thu, 16 Jun 2005 16:05:48 GMT

Yeah; we can dream can't we. When I was a kid there was a Ford dealer up the block. They had the Shelby 427 version in the showroom, it was funny to see all the kids lined up and staring at the car like the little rascals.