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Validation of a Short German Physical Activity Questionnaire: Anthropometric, Physiological and Psychological Considerations

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Abstract

Background: Short Physical Activity Questionnaires (PAQs) offer significant value for various reasons, particularly in assessing physical activity while minimizing participant burden. Short English language PAQs have shown validity and reliability. However, a validated short PAQ does not exist in German. Therefore, this study validated a short German PAQ using various validation measures including anthropometric, physiological, and psychological indicators.

Methods: Healthy adults (n=186; 42.5% female; mean age=24.7, SD=4.7) from seven projects completed the German short PAQ and a range of validation measures.

Results: Moderate to Vigorous Physical Activity (MVPA) was correlated with body fat (BF)=-.16, p=.03, pulse wave velocity=.16, p=.05, maximum oxygen consumption (VO_2 max)=.26, p=.001 and physical activity stages of change (PA stage)=.39, p<.001. MVPA was marginally correlated with muscle mass=.14, p=.07 and Handgrip Strength (HGS)=.21, p=.07; and not correlated with the other variables (ps>.01). The individuals who met the MVPA guidelines according to the German PAQ had lower heart rate, higher HGS, higher VO_2max, and higher PAstage versus those that did not (ps<.05).

The BF result was marginally lower for those meeting the MVPA guidelines (p=.07). The other variables revealed no significant differences. Separating analyses by sex did not affect the results.

Discussion: This study provides preliminary evidence of the validity of the short German PAQ. This is promising, as a short German PAQ facilitates large scale German speaking prevalence, surveillance, intervention, or evaluation efforts.

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Introduction

"It is impossible to change things that cannot be measured."

Physical Activity (PA) measurement is of paramount importance to document PA prevalence, benefits or adverse PA outcomes, PA intervention efficacy, dose-response PA and health outcome relationships. This in turn leads to high-quality evidence-based recommendations. In specific instances, a self-reported PA measures is preferable to device-based measures, which can only capture selected aspects of the behavior but not the subjective aggregation.

PA Questionnaires (PAQs) are a type of self-report that allows for both assessment of quantitative, e.g., minutes of walking behavior, and qualitative, e.g. hiking, measures.

In the German language, only longer PAQs exist (in alphabetical order):

- The Baecke Questionnaire [1,2].
- The Bewegungs-und Sportaktivität Fragebogen [3].
- The Freiburger Fragebogen zur körperlichen Aktivität [4].
- The Motorik-Modul Aktivitäts Fragebogen [5,6].

Short PAQs are valuable when only an overall or very specific indicator of PA is needed; and to reduce participant burden (questionnaire length; participant demands) which potentially reduces participant drop-out/attrition. Although short PA questionnaires have been shown to be valid and reliable [7,8], the authors are not aware of validated short PAQs in German. Therefore, this study validated a short German PAQ using various indirect validation measures including anthropometric, physiological, and psychological indicators. These indicators have been utilized as a reference standard to validate PAQs [9], PA correlates with renowned health and performance measures [10], and previous research has demonstrated a correlation between PA and anthropometric parameters. These include Body Mass Index (BMI) [11,12], body composition [13,14] and Waist-to-Height Ratio (WHtR) [13,15,16]. Moreover, performance and hemodynamic parameters are also linked to PA and serve additionally as a reliable indicator for overall health [17-23].

It was hypothesized that:

1) Higher MVPA, as measured by the short German PA questionnaire, is related to healthier levels of 1) anthropometrics 2) physiological indicators and 3) psychological indicators;

2) Participants that meet the Moderate to Vigorous (MV) PA guidelines (WHO, 2020) according to the short German PA questionnaire have healthier levels of 1) anthropometrics 2) physiological indicators and 3) psychological indicators.

Methods

Participants

This investigation involved a sample of healthy adults (>18 years) (n=186; 42.5% female; mean age=24.7, SD=4.7) from seven projects that assessed the German short PAQ along with a range of validation measures.

Procedures

All participants were informed about the purpose, procedures, and study risks, and informed consent was obtained. The data collection was conducted in accordance with the Helsinki Declaration and all included studies were approved through the University of Bern's institutional Research Ethics Board.

Participants were instructed to refrain from consuming caffeinated, alcoholic beverages or nicotine four hours before the examination. In addition, the participants were instructed to avoid intense physical activity for 48 hours prior to the data collection. Participants were also asked to be normally hydrated and were invited to void their bladder and bowels immediately prior to measurement. The individual study methods are summarized in (Table 1).

Table 1: Included study summary descriptions.

Study	Sample (N; % female; mean age ± SD (years))	Purpose	Recruitment method	Validation variables assessed
#1	26; 100%; 24.1±2.9	Effect of an endurance training intervention tailored to the menstrual cycle on performance development and recovery – a pilot study.	Personal network, social media, and announcements at the University of Bern	BMI, BF, MM, WC, WHtR, HR, RMSSD, sBP, dBP, PWV, CMJ, VO_2max
#2	8; 25%; 22.1±1.4	Health and Fitness status in sport students	Personal network	BMI, BF, MM, WC, WHtR, HR, RMSSD, VO_2max
#3	12; 100%; 21.3±3.4	Validation of a portable indirect calorimetric gas-exchange analysis system (VO_2master)	Personal network, and announcements at the University of Bern	BMI, BF, MM, WC, WHtR, HR, RMSSD, CMJ, VO_2max
#4	12; 0%; 24.1±2.8	Effects of caffeine, carbohydrate and creatin supplementation on anaerobic performance	Personal network, and announcements at the University of Bern	BMI, BF, MM, WC
#5	51; 4%; 23.1±2.2	Health and fitness status in competitive esports players	personal network, social media	BMI, BF, MM, WC, WHtR, HR, HR, RMSSD, CMJ, HGS, VO_2max
#6	22; 27%; 25.4±7.4	Effects of an exergame-based intervention on performance and health parameters	Social media, announcements at the University of Bern, Universities of Applied Sciences Bern	BMI, BF, MM, WC, WHtR, HR, , RMSSD, sBP, dBP, PWV, CMJ, HGS, VO_2max
#7	6; 0%; 22.6±1.3	Determining the physical stress of competitive videogaming	Personal network, social media	BMI, BF, MM, WC, WHtR, HR, RMSSD, sBP, dBP, PWV, CMJ, HGS, VO_2max
#8	18; 0%; 31.4±6.0	Determining the effects of the Wim Hof method on different health outcomes	Personal network, announcements at the University of Bern	BMI, BF, MM, WC, WHtR, HR, RMSSD, sBP, dBP, PWV
#9	31; 100%; 25.7±3.89	Effect of an endurance training intervention tailored to the menstrual cycle on performance development and recovery	Personal network, social media, and announcements at the University of Bern	BMI, BF, MM, WC, WHtR, HR, RMSSD, sBP, dBP, PWV, CMJ, VO_2 max

Abbreviations: SD: Standard Deviation; BMI: Body Mass Index; BF: Body Fat; MM: Muscle Mass; WC: Waist Circumference; WHtR: Waist-to-Height Ratio; HR: Heart Rate; RMSSD: Root Mean Square of Successive Differences between normal heartbeats; sBP: peripheral systolic Blood Pressure; dBP: peripheral diastolic Blood Pressure; PWV: Pulse Wave Velocity; CMJ: Countermovement Jumps; HGS: Handgrip Strength; VO_2max: Maximal Oxygen Consumption; PAstage: Physical Activity stages of change.

Measures

The following measures were used in at least one of the included studies.

Anthropometrics

Height was measured barefoot with a stadiometer to the nearest 0.5 cm. A bioelectrical impedance scale (BC-545 Innerscan, Tanita, Amsterdam, Netherlands) was used to assess body mass, and calculate Body Fat (BF), and Muscle Mass (MM) while the participants wore light sportswear. The waist circumference was measured with a nonelastic tape to the nearest 0.1 cm midway between the costal arch and the upper edge of the hip bone (iliac crest). BMI was calculated as a function of weight in kg and height in meters (m) (kg/m^2), and WHtR was calculated as a function of waist circumference and height (waist circumference/height).

Heart rate variability

Heart Rate Variability (HRV) was obtained using a heart rate monitor and a chest strap (Polar H10, Polar Electro OY, Kempele, Finland). After a 5 min supine rest period and a stabilized HRV signal, a 5.5 min measurement was conducted. Intervals between successive heartbeats were recorded with a sampling rate of 1000 Hz [24]. Throughout the measurement period, patients were instructed to breathe normally, remain silent, and stay calm.

HRV analysis was performed on a 5 min excerpt of the measurement. The raw data were processed using the app Elite HRV (Elite HRV Inc, 2022) which has been shown to be valid and reliable [25]. The root mean square of successive differences between normal heartbeats (RMSSD in ms) and the Heart Rate (HR) were analyzed.

Hemodynamics

Peripheral systolic (sBP) and diastolic (dBP) blood pressure, as well as Pulse Wave Velocity (PWV) were determined non-invasively using Mobil-O-Graph® (PWA-Monitor, IEM, Stollberg, Germany), which is a clinically validated device for hemodynamic measurements [26]. After a 10 min supine rest, a minimum of two readings were performed on the right upper arm using customized arm cuffs. The average of the two readings was used for analysis.

Performance tests

Strength measurements

Countermovement jump: After a familiarization test, the participants conducted two bilateral Countermovement Jumps (CMJ) using an Optojump photocell system (Microgate, Bolzano, Italy), a validated tool for assessing jump height [27]. The participants started upright with their hands on their hips, dipped down, and then jumped as high as possible during the subsequent concentric phase. The flight time was measured, and the jump height was calculated. Both trials were performed without shoes and a 30 sec resting period in between. The maximum jump height of the two CMJ trials was used for analysis.

Handgrip strength: The Handgrip Strength (HGS) was recorded using a digital hand dynamometer Saehan DHD-1 (SAEHAN Corporation, Masan, South Korea). After a demonstration and familiarization with the equipment, two trials to assess maximum isometric strength for the right and left hand were conducted. The participants were instructed to sit upright on a chair with back support, with their elbow flexed at 90° and their forearm in a horizontal position. The grip width of the hand dynamometer handle was adjusted to an appropriate width. The hand was required to be positioned so that the thumb was around one side of the handle and the other four fingers around the opposite side. Participants were then instructed to squeeze as hard as possible for as long as possible until a maximum value in kg was recorded on the dynamometer. The maximum value of the four trials was taken for analysis. A rest interval of 30 seconds was provided between trials. During the test, verbal encouragement by the study staff was provided.

Endurance

Cardiopulmonary exercise test: Subjects completed a Cardiopulmonary Exercise Test (CPET) either on a treadmill (h/p/cosmos pulsar 4.0; h/p/cosmos sports & medical Gmbh, Nussdorf-Traunstein, Germany) or an electronically braked bicycle ergometer (ergoselect 800, Ergoline GmbH, Bitz, Germany) until voluntary exertion. The following protocols were used in the different studies:

Study #3: The CPET was performed on a treadmill ergometer, with the initial speed set at 7 km/h. Each stage lasted 1 minute, and after each stage, the speed was increased by 1 km/h until the participants reached volitional exhaustion.

Study #1 and #9: The CPET was performed on a treadmill ergometer, with theinitial speed set at 6.6 km/h. Each stage lasted 3 minutes, interspersed by 30 sec of rest. After each stage, the speed increased by 1.2 km/h until the participants reached volitional exhaustion.

Studies #5 and #6: The CPET was performed on a bicycle ergometer. The test started at 50 or 75 watts (depending on lean body mass and training status) with a stepwise increment of 25 Watts per minute. The participants completed a five-minute warm-up at the respective starting watt level before proceeding to the stepwise performance test. They cycled on the bicycle until they reached voluntary exhaustion or could no longer maintain a cadence greater than 60 revolutions per minute.

Two validated metabolic carts were used to record maximal oxygen consumption (VO_2 max), the Metalyzer 3B (Cortex, Leipzig, Germany) (Studies: #1/#5/#6) and Oxycon Pro (Erich Jaeger GmbH, Hoechberg, Germany) (Studies: #2/#3) [28,29]. The highest 30s VO_2 value was recorded as VO_2 max. To ensure that each participant attained valid VO_2 max, at least two of the following criteria had to be met: plateau in oxygen uptake with increasing exercise intensity, respiratory exchange ratio >1.1, and achievement of age-predicted maximal heart rate.

Before each testing session, a two-point calibration procedure was conducted according to the manufacturer's guidelines. The calibration of the oxygen and carbon dioxide sensors was performed with gases of known concentrations. The flow rate was calibrated using a 3-liter volume syringe, according to the manufacturer's instructions. Additionally, ambient air measurements were taken before each test.

Self-reported PA

PA stage of change (PA stage) was assessed by an individual's readiness to participate in regular PA. Participants were asked about their readiness to participate in 150 minutes of MVPA per week, with the activity leading to an increased heartrate and breathing harder. Answers were classified in five stages based on the stages of the Transtheoretical Model: precontemplation,

contemplation, preparation, action, and maintenance. Versions of this measure have been validated across different sociodemographic groups [30-32].

To assess the leisure-time physical activity over a typical 7-day period, an adapted version [33,31] of the Godin-Shepard leisure time physical activity questionnaire (GSLTPAC) [8] translated into German (see Appendix) was used. The GSLTPAC has documented validity for across the lifespan [34,32,35]. The frequency (days/week) and duration (minutes/day) separately of light, moderate and vigorous PA was assessed. Light activity is classified as non-exhaustive and non-sweating activities, such as light walking or golfing. Moderate activity is classified as a bit exhaustive and some sweating activities, such as fast walking or moderate swimming. Vigorous activity is classified as exhaustive and sweating activities, such as football (soccer) or skiing. MVPA minutes per week was calculated as moderate PA days per week × moderate PA minutes per day + vigorous PA days per week × vigorous PA minutes per day.

Results

Participants' characteristics are presented in (Table 2). The majority of the participants (72.6%) met the guideline of 150 MVPA min/week (WHO, 2020). Skewness and Kurtosis were for all variables within acceptable limits (<4) thus data was not transformed.

Table 2: Descriptives of the study variables.

Variable	N	Mean	SD
BMI (kg m^{-2})	186	22.98	2.90
BF (%)	184	21.07	6.67
MM (kg)	178	52.50	9.44
WC (cm)	153	76.79	8.29
WHtR	153	0.44	0.04
HR (min^{-1})	153	66.35	11.61
RMSSD (ms)	154	65.19	36.22
sBP (mmHg)	154	119.95	9.81
dBP (mmHg)	154	71.90	7.99
PWV (m/s)	147	5.25	0.49
CMJ (cm)	134	29.97	8.07
HGS (kg)	79	45.69	8.01
VO_2max (ml/min/kg)	149	44.06	7.79
PAstage	89	4.47	0.95
MVPA (min/week)	186	359.73	322.88

Abbreviations: SD: Standard Deviation; BMI: Body Mass Index; BF: Body Fat; MM: Muscle Mass; WC: Waist Circumference; WHtR: Waist-To-Height Ratio, HR: Heart Rate; RMSSD: Root Mean Square of Successive Differences Between Normal Heartbeats; sBP: Peripheral Systolic Blood Pressure; dBP: Peripheral Diastolic Blood Pressure; PWV: Pulse Wave Velocity; CMJ: Countermovement Jump; HGS: Handgrip Strength; VO_2 max: Relative Maximal Oxygen Consumption; Pastage: Physical Activity Stages of Change; MVPA: Moderate to Vigorous Physical Activity.

Table 3: Study variable differences of meeting PA guidelines versus not based on the short German PAQ.

Variable	Meet PA guideline	N	Mean	SD	df	F	p	η^2
BMI	Yes	135	22.86	2.46	1,184	0.73	0.39	0.00
	No	51	23.27	3.85				
	Total	186	22.98	2.90				
BF (%)	Yes	134	20.53	6.61	1,182	3.28	0.07	0.02
	No	50	22.52	6.69				
	Total	184	21.07	6.67				
MM (kg)	Yes	127	52.85	9.02	1,176	0.60	0.44	0.00
	No	51	51.64	10.45				
	Total	178	52.50	9.44				
WC (cm)	Yes	102	76.40	7.22	1,151	0.68	0.41	0.00
	No	51	77.58	10.15				
	Total	153	76.79	8.29				
WHtR	Yes	102	0.44	0.04	1,151	1.26	0.26	0.01
	No	51	0.45	0.05				
	Total	153	0.44	0.04				
HR (min^{-1})	Yes	107	65.02	11.65	1,151	4.77	0.03*	0.03
	No	46	69.43	11.03				
	Total	153	66.35	11.61				
RMSSD (ms)	Yes	103	67.16	35.14	1,152	0.92	0.34	0.01
	No	51	61.21	38.36				
	Total	154	65.19	36.22				

sBP (mmHg)	Yes	103	119.64	9.69	1,152	0.32	0.57	0.00
	No	51	120.59	10.12				
	Total	154	119.95	9.81				
dBP (mmHg)	Yes	103	71.72	7.75	1,152	0.14	0.70	0.00
	No	51	72.25	8.52				
	Total	154	71.90	7.99				
PWV (m/s)	Yes	102	5.26	0.52	1,145	0.32	0.57	0.00
	No	45	5.21	0.41				
	Total	147	5.25	0.49				
CMJ (cm)	Yes	84	29.74	8.11	1,132	0.18	0.67	0.00
	No	50	30.36	8.07				
	Total	134	29.97	8.07				
HGS (kg)	Yes	43	47.75	6.92	1,77	6.68	0.01**	0.08
	No	36	43.23	8.61				
	Total	79	45.69	8.01				
VO_2 max (ml/min/kg)	Yes	99	45.48	7.70	1,147	10.48	0.00***	0.07
	No	50	41.24	7.23				
	Total	149	44.06	7.79				
PA stage	Yes	75	4.65	0.76	1,87	21.17	0.00***	0.20
	No	14	3.50	1.29				
	Total	89	4.47	0.95				

Abbreviations: SD: Standard Deviation; BMI: Body Mass Index; BF: Body Fat; MM: Muscle Mass; W: Waist Circumference; WHtR: Waist-To-Height Ratio, HR: Heart Rate; RMSSD: Root Mean Square of Successive Differences Between Normal Heartbeats; sBP: Peripheral Systolic Blood Pressure; dBP: Peripheral Diastolic Blood Pressure; PWV: Pulse Wave Velocity; CMJ: Countermovement Jump; HGS: Handgrip Strength; VO_2 max: Relative Maximal Oxygen Consumption; Pastage: Physical Activity Stages of Change. *- p<.05; **- p<.01; ***- p<.001.

Pearson correlations revealed MVPA was correlated with BF, PWV, VO_2max and PA stage; marginally correlated with MM and HGS; and not correlated with the other variables. Specifically, the correlations with MVPA were: BMI=0.00, p=.95; BF= -.16, p=.03; MM=.14, p=.07; WC=.02, p=.78; WHtR=-.04, p=.63, HR=-.01, p=.90; RMSSD=-.01, p=.91; sBP=-.00, p=.96; dBP=-.10, p=.22; PWV=.16, p=.05; CMJ=-.09, p=.30; HGS=.21, p=.07; VO2max_relative=.26, p=.001; and PA stage=.39, p<.001.

Analyses of Variance revealed that the participants who met the MVPA guidelines according to the German PAQ had reduced HR, an increased HGS and VO_2 max, as well as a higher PAstage versus those that did not meet the guidelines (ps<.05; see (Table 3)). The BF was marginally lower for those meeting the MVPA guidelines (p=.07). The other variables revealed no significant differences. Separating analyses by sex did not affect the conclusions.

Discussion & conclusion

This study validated a short German PAQ using anthropometric, physiological, and psychological indicators. The results indicate that individuals who meet the MVPA guidelines based on the short German PAQ exhibit healthier levels of anthropometric, physiological, and psychological indicators. The findings revealed significant correlations between MVPA and BF, PWV, VO_2max, and PAstage. Additionally, there were marginal correlations between MM and HGS. Although not necessarily significant, 12/14 (86%) indicators were in the hypothesized direction – those who met the MVPA guidelines (WHO, 2020) according to the short German PAQ performed better versus those who did not. Further, at least one variable from each overarching category (anthropometrics [marginal], physiological and psychological) was significantly different in the hypothesized direction. Thus, this study provides preliminary evidence of the validity of the short German PAQ. Results are similar in magnitude to validation studies with brief English language PA self-report measures [34,36,32,35]. Previous validation studies on the English version of the GSLTPAQ indicate that individuals classified as active demonstrated higher VO_2max and lower BF levels compared to those classified as insufficiently active [34]. Furthermore, previous validation studies examining the correlation between the Godin leisure score and VO_2max reported a higher correlation coefficient of 0.56 [37]. Similarly, the correlation between the Godin score and BF, assessed using hydrostatic weighing, was also higher (-0.43) than the correlation observed in the present study.

The correlations observed between MVPA and VO_2 max and PWV are particularly notable due to their significant influence on all-cause mortality. VO_2 max, in particular, is regarded as one of the most robust predictors of all-cause mortality [38]. Furthermore, PWV, serving as an indicator of arterial stiffness, plays a crucial role in the onset of hypertension and serves as a predictor of cardiovascular events [39], even after accounting for other established risk factors [22].

The results are promising, as a short German PAQ facilitates large scale German speaking prevalence, surveillance, intervention, or evaluation efforts. Additionally, having the option of a short German PA measure allows the inclusion of PA in studies that have substantial assessments (e.g., clinical studies or multibehavioral studies) adding very little to the participant burden.

There are some limitations that should be considered when interpreting the results. Firstly, no device-based measure (e.g., accelerometer) of PA was used in this validation. Secondly, the study utilized a cross-sectional design. Longitudinal or experimental designs would provide stronger evidence for understanding temporal and causal associations. Third, the sample was geographically limited, reducing the generalizability of the findings to other populations. Further, the sample size did not have sufficient power to allow for subgroup analyses. This could limit the ability to detect significant differences or associations within specific subgroups of interest.

This notwithstanding, this study provides preliminary evidence of validity of a short German PAQ. Further research should include more diverse samples, device-based PA assessment, and investigate test-retest reliability. Furthermore, studies should examine if this measure is sensitive to change in PA over time and thus serve as a valuable tool for monitoring and evaluating intervention programs. This would strengthen the evidence of the quality of the short German PAQ.

Declarations

Competing interests: The authors do not have any conflicts of interests to declare.

Funding: No funding was received for conducting this study.

Ethics approval: All subjects provided informed consent and data collection was conducted in accordance with the Helsinki Declaration. All included studies were approved through the Faculty of Human Sciences, University of Bern's institutional Research Ethics Board.

Data: Data used for these analyses may be obtained from the corresponding author upon reasonable request.

Authors' contributions: CRN conceptualized the research question, conducted the data analysis, wrote the introduction, results, and discussion. SK and CK led the individual projects' data collection, developed the methods section, and provided input on design, analyses and interpretation. All authors read and approved the final manuscript version.

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Appendix: The short german physical activity questionnaire (Der Kurze Körperliche Aktivitäts-Fragebogen).

Körperliche Aktivität								
In diesem Abschnitt geht es um körperliche Aktivität in der Freizeit. Bitte kreuzen Sie die Anzahl der Tage in der Woche und geben Sie die Anzahl der Minuten pro Tag an, die am besten beschreiben, wie viel Sie sich bewegen:								
Anstrengende Aktivität (Sie lässt das Herz schnell schlagen und bringt dich ins Schwitzen.) Beispiele sind: Laufen, Joggen, schnelles Radfahren, Rollschuhfahren schnelles Schwimmen, Wandern, Fussball, Basketball.	**a) An wie vielen Tagen pro Woche verrichten Sie anstrengende körperliche Aktivitäten?**							
	0	1	2	3	4	5	6	7
	O	O	O	O	O	O	O	O
	b) Wie viele Minuten pro Tag verbringen Sie mit anstrengenden körperlichen Aktivitäten?							
	Anzahl Minuten ___							
Moderate Aktivität (Sie ist ein bisschen anstrengend, leicht erhöhtes Herzklopfen und bringt dich ein wenig ins Schwitzen) Beispiele sind: schnelles Gehen, langsames Radfahren, leichtes Schwimmen, Tennis, Tanzen, Volleyball, Tischtennis, Skateboard fahren.	**a) An wie vielen Tagen pro Woche verrichten Sie moderate körperliche Aktivitäten?**							
	0	1	2	3	4	5	6	7
	O	O	O	O	O	O	O	O
	b) Wie viele Minuten pro Tag verbringen Sie mit moderaten körperlichen Aktivitäten?							
	Anzahl Minuten ___							
Leichte Aktivität (Sie ist wenig anstrengend, dein Herz schlägt normal und bringt dich nicht ins Schwitzen). Beispiele sind: leichtes Gehen, Bowling, Angeln, Golf, Yoga._	**a) An wie vielen Tagen pro Woche verrichten Sie leichte körperliche Aktivitäten?**							
	0	1	2	3	4	5	6	7
	O	O	O	O	O	O	O	O
	b) Wie viele Minuten pro Tag verbringen Sie mit leichten körperlichen Aktivitäten?							
	Anzahl Minuten ___							

Bewertung:

a) Minuten pro Woche von Moderate bis anstrengende Aktivität (MVPA) = (1a)(1b) + (2a)(2b).

b) MET Minuten pro Woche = 9x(1a)(1b) + 5x(2a)(2b) + 3x(3a)(3b) (Godin & Shepard, 1985).